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Conditions Affecting College and University Financial Strength

Charles J. Andersen

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HIGHLIGHTS

- Significant increases in full-time enrollment during the four-year period 1980–81 through 1983–84 were reported by one-third of the nation's colleges and universities. During the same period, one-fifth of the institutions reported significant enrollment decreases.
- Significant increases in net tuition were reported by nearly 3 out of 5 institutions. Only one-quarter of the colleges and universities—mostly private—reported significant increases in endowment earnings.
- Revenue shortfalls were reported by nearly half of the colleges and universities. There was a slightly higher incidence of this condition among public institutions than among private.
- Eighty percent of the public institutions with revenue shortfalls listed reduced external funding as a reason for that condition. Seventy percent of the private institutions listed enrollment drops as a reason for their revenue shortfall.
- Over half the institutions with revenue short-fall found that increased efforts in fund-raising, student retention, and student recruitment had highly beneficial impacts on their financial condition.
- Three specific management practices—long-range planning, program review, and cash management—were used by about three-quarters of the nation's institutions. A fourth practice, use of a central contingency fund, was reported by only half of the colleges and universities.
- Of the four management practices, cash management received the highest rating for usefulness.
- Expectations of doing better in the next five years than in the past four were reported by about half of the baccalaureate colleges and specialized institutions. However, one-quarter expected to have difficulty unless they take adaptive actions.
- One-third of the comprehensive institutions and the two-year colleges expected to do better in the next five years. About the same percentage expected to have difficulty.
- Generally, institutions that expected to do better in the near future were more likely to be users of the four management practices than institutions that were expecting to have difficulty in the next five years.

BACKGROUND

The Department of Education's Office of Planning, Budget, and Evaluation in 1984 proposed a Higher Education Panel survey that would examine conditions affecting the financial status of institutions of higher education. The survey was undertaken in response to concern that a large number of colleges and universities may be in financial distress due to demographic changes, economic conditions, and/or management deficiencies.

The survey was to review what changes have occurred among colleges and universities, and what actions institutions have taken over the past four years to sustain themselves in the face of these changes. The thrust of the survey was not with the specifics of institutional finance, but with institutional "self-help" in the form of management practices and strategies that have been adopted.

The study is intended to help Department officials identify problem areas and point toward actions that may be undertaken at the federal level.

METHODS SUMMARY

The Higher Education Panel forms the basis of a continuing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct surveys on topics of current policy interest to the higher education community and to government agencies.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities drawn from the population of more than 3,200 institutions listed in the National Center for Education Statistics' *Education Directory, Colleges and Universities*. All institutions in the population are grouped according to the Panel's stratification design, which is based upon institution **type** (research university, comprehensive university or college, baccalaureate college, specialized institution, two-year college), **control** (public, private), and **size** (full-time-equivalent enrollment). An expansion of the Panel conducted in 1983 permits it to be split into two separate "half-samples" in order to reduce the questionnaire burden on Panel members. This survey employed one of the half-samples.

The survey procedure is dependent upon a network of campus representatives at the Panel institutions whose presidents have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus officials for response.

Questionnaires for this study were mailed to 438 colleges and universities.[1]

Initial returns plus those resulting from mail and telephone follow-ups resulted in an 84 percent response rate. A copy of the survey instrument is included as Appendix A.

Data from responding institutions were statistically adjusted (weighted) to represent the national population of colleges and universities (excluding research universities). Institutional weights were based upon the ratio of the number of respondents to the number of institutions in the population, separately for each stratum.

Appendix B presents the stratification design used to produce the national estimates and a comparison of respondents and nonrespondents.

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[1] Excluded from the survey were the 165 research universities—institutions such as Columbia University, the University of North Carolina, Chapel Hill, the University of Chicago, U.C.L.A. Their complex administrative organization made it virtually impossible for them to provide meaningful answers to key questionnaire items.

FINDINGS

Introduction

During the four-year period covered by this report, one-third of the nation's institutions of higher education experienced significant increases in enrollment.[2] This was at a time when the traditional college-age population was declining. More than half of the nation's institutions reported significant increases in their net tuitions. Yet nearly half of the colleges and universities experienced a shortfall of revenue under expenditures. Many of these "shortfall" institutions used a variety of management practices, of which only a few—those related to fund-raising and increasing enrollments—were deemed to have a highly beneficial impact on the institution's financial condition.

Most institutions—both those that did and those that did not experience a revenue shortfall—were using four planning and financial management practices. Use of the latter (cash management and a central contingency fund) was reported more frequently by institutions without revenue shortfall than by those that had experienced deficits during the period. Use of the planning techniques—long-range planning and program review—did not show such contrast.

About 4 out of 10 institutions expected to do better in the next five years than they did in the past four. About 3 out of 10 institutions expected to have difficulty in the near future, and one-quarter expected to maintain their current level of operations without the introduction of new major strategies.

The following pages elaborate on this brief summary. The report is divided into four major sections. The first is concerned with recent trends in enrollment, student characteristics, program offerings, and selected funding sources. This first section also shows the number of colleges and universities that have recently experienced revenue shortfalls and identifies relationships that appear between these shortfalls and recent trends.

The second portion examines the degree to which institutions with revenue shortfall have used 38 management strategies and if those strategies have had a beneficial impact on the institutions' financial condition.

The third part examines the extent to which colleges and universities have employed four major management practices: (1) long-range planning, (2) program review, (3) cash management, and (4) the use of a central contingency fund. It also examines the relationship of these practices to revenue shortfalls. The final part considers institutional expectations for the next five years.

The numbers and percentages contained in these discussions are estimates based on a sample of all types of institutions (except major research universities); included in the sample were comprehensive colleges and universities, baccalaureate colleges, two-year colleges, and specialized institutions.

Recent Trends

How do senior institutional administrators view the past four years? Have most of the nation's colleges and universities experienced significant changes in program offerings, enrollment, student characteristics, or financing sources in these years? Has one type of institution experienced a greater degree of change than another? The answer to these questions is that a majority of survey respondents reported no significant changes in most areas.

For 16 of the 19 trend items included in the survey, fewer than one-half of the respondents reported significant change. Table A shows the trend items and the percentage of respondents that indicated change. Fewer than one-third noted significant change in students' geographic origins, selected student characteristics, or program offerings. Notably, only one-quarter reported significant change in families' ability to pay for college; one-third noted significant change in the enrollment of women.

Although there were only three items in which change was noted by more than half of the respondents, they were items of basic importance—full-time enrollment, part-time enrollment, and net tuition. Table B shows the direction and degree of change for these three.

One-third of the institutions reported increases in enrollments and about three-fifths reported increases in net tuition. There was no great difference between the proportion of public and private institutions reporting increases in tuition and in full-time enrollment. Part-time enrollments were a different story. Nearly half of the public institutions reported increases in that area, whereas only a third of the private institutions did.

Significant decreases in full-time enrollment were reported by about one-fifth of both public and private institutions. Decreases in part-time enrollment were reported by one-sixth of the public and one-tenth of the private institutions. Few institutions reported decreases in net tution.

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[2] The use of the word "significant" in this report requires a word of explanation. The terms "significant increase," "significant decrease," and "no significant change" appeared as response options for several of the survey questionnaire items. On the survey instrument, however, the word "significant" was not defined in specific quantitative terms. Rather, it was suggested that respondents consider a "significant change" as "one that influences decision making." As used in the narrative that follows, the term does *not* mean that the data have been subjected to tests of statistical significance. It is used to report how respondents answered questionnaire items that included the term. See Appendix A for a copy of the questionnaire.

TABLE A—Percentage of Institutions That Reported Significant Changes in the Period 1980/81–1983/84

Trend Item	Percent
1. **Student Geographic Origins**	
a. Out-of-state	17
b. Commuters	15
c. In-state	14
2. **Student Characteristics**	
a. Family ability to pay	25
b. Median age	21
c. Academic ability	21
3. **Program Offerings**	
a. Number of adult/community service programs	33
b. Number of courses	28
c. Total number of programs	27
d. Number of science and mathematics programs	20
4. **Sources of Funds**	
a. Net tuition (tuition and fees less institutional student aid)	62
b. Student financial aid from all public sources	35
c. State and local governments (except student aid)	31
d. Federal government (except student aid)	29
e. Endowment earnings	28
f. Student financial aid from all private sources	26
5. **Enrollment**	
a. Full-time	54
b. Part-time	51
c. Female	35

Reference: Table 1

TABLE B—Degree of Change in Selected Trend Items, 1980/81–1983/84

Trend Item Degree of Change	All Institutions	Public Institutions	Private Institutions
Full-time Enrollments			
Significant *increase*	34	32	36
Significant *decrease*	19	21	18
No change	47	47	46
Part-time Enrollments			
Significant *increase*	39	45	34
Significant *decrease*	12	16	9
No change	49	39	57
Funds from Net Tuition			
Significant *increase*	58	56	60
Significant *decrease*	4	4	4
No change	38	40	36

Reference: Table 1

Revenue Shortfall

Important as changes in programs, enrollment, and student characteristics may be, even more important to an institution's strength is its "bottom line." Forty-five percent of the nation's colleges and universities experienced a revenue shortfall at some time during the last four years. A slightly higher share of the public institutions reported this condition than did the private colleges. Baccalaureate and specialized institutions reported the lowest proportional incidence of shortfall, and comprehensive universities the highest (see table C).

TABLE C—Percentage of Institutions with Revenue Shortfall, by Control and Type of Institution, 1980/81–1983/84

Control and Type of Institution	Percentage
All institutions	45
Public	49
Private	42
Comprehensive	54
Baccalaureate	43
Two-year	45
Specialized	43

Reference: Table 4

Three specific causes for the shortfall were listed in the questionnaire: (1) increased costs, (2) enrollment shortfall; and (3) reduced external funding. Respondents were asked to indicate if any or all of the three were, in fact, causes of their revenue problems. Seventy-four percent of the respondents indicated increased costs; 59 percent, enrollment shortfall; and just over half, reduced external funding. Table D shows rather wide differences in responses to these causes, depending on the institutional type and control.

Enrollment shortfall was cited by 71 percent of the private institutions, and by less than half of the public institutions. The former rely more heavily than do public colleges on tuition for their income and their financial condition is therefore highly sensitive to enrollment levels.

Reduced external funding, including reduced funding from the state, was cited by 82 percent of the public institutions, but by less than one-third of the private colleges.

Increased costs would seem to affect all colleges and universities equally. The survey data show, how-

TABLE D—Reasons for Revenue Shortfall, by Control and Type of Institution

Control and Type of Institution	Percentage of Institutions with Shortfall That Cited- Reduced External Funds	Enrollment Shortfall	Increased Costs
All institutions	55	59	74
Public	82	46	65
Private	29	71	83
Comprehensive	67	51	68
Baccalaureate	43	83	81
Two-year	64	56	70
Specialized	39	43	80

Note: Because multiple responses were permitted, the sum of the percentages exceeds 100.
Reference: Table 4

ever, that a higher percentage of private institutions than public cited such costs as a significant cause of their revenue shortfall. Baccalaureate and specialized institutions, in particular, were affected by the condition.

Shortfall and Recent Trends

The relationships between institutions' status regarding shortfall and recent trends in enrollment, financing, and programming is shown in figure 1. For all except one trend item, more institutions without revenue shortfall than with reported increases. That exception is federal funds.

Some relatively large differences do exist between the shortfall and no-shortfall institutions. (In this context, a "relatively large difference" is when the difference between the two percentages is roughly 50 percent or more of the smaller percentage.) For example, increases in enrollment were reported by 41 percent of the no-shortfall institutions in contrast to only 27 percent of the shortfall institutions—a difference of 14 percentage points. Increases in state and local funding were reported by 21 percent of the no-shortfall institutions compared with only 9 percent of the shortfall institutions—a difference of 12 percentage points.

The enrollment of women and the development of programs for adult education and community services are also areas where the differences between the shortfall and no-shortfall institutions are relatively large.

Conversely, the institutions with shortfall more frequently reported decreases in the trend measures, as illustrated on the right-hand side of figure 1. With only a few exceptions, the differences are quite small.

One of these exceptions is the area of full-time enrollment; over 34 percent of the shortfall institutions reported decreases in enrollment, but only 6 percent of the no-shortfall colleges did. Other notable contrasts are in the areas of net tuition (8 percent of the shortfall institutions versus less than 1 percent of those with no shortfall), and state and local government funding. Nearly one-quarter of the shortfall institutions reported decreases in that kind of support; only 9 percent of the no-shortfall institutions indicated decreases.

Management Strategies

Each institution that had experienced revenue shortfall was asked to identify and rate certain specific management strategies (from a list of 38) that it had used in the four-year period. The ratings were to indicate how beneficial the strategies had been in improving the institution's financial condition; they ranged from 5 (highly beneficial impact) to 1 (low beneficial impact). Only 10 of the 38 strategies had been used by one-third or more of the institutions. Only 5 of those 10 received high scores (5 or 4) from a majority of the raters. Table E shows the ten most frequently used strategies, the percentage of institutions that used them, and the percentage that rated them highly.

Increased fund-raising was the strategy used by more institutions than any other **and** the one that received the largest number of "highly beneficial" scores. Maintaining or increasing enrollments were also frequently used strategies and the latter was rated highly beneficial.

Several strategies received high ratings for effectiveness but were used by fewer than one-third of the institutions. Table E also shows four such strategies; they were used by 10 to 33 percent of the shortfall institutions **and** received high scores from more than half of their users.

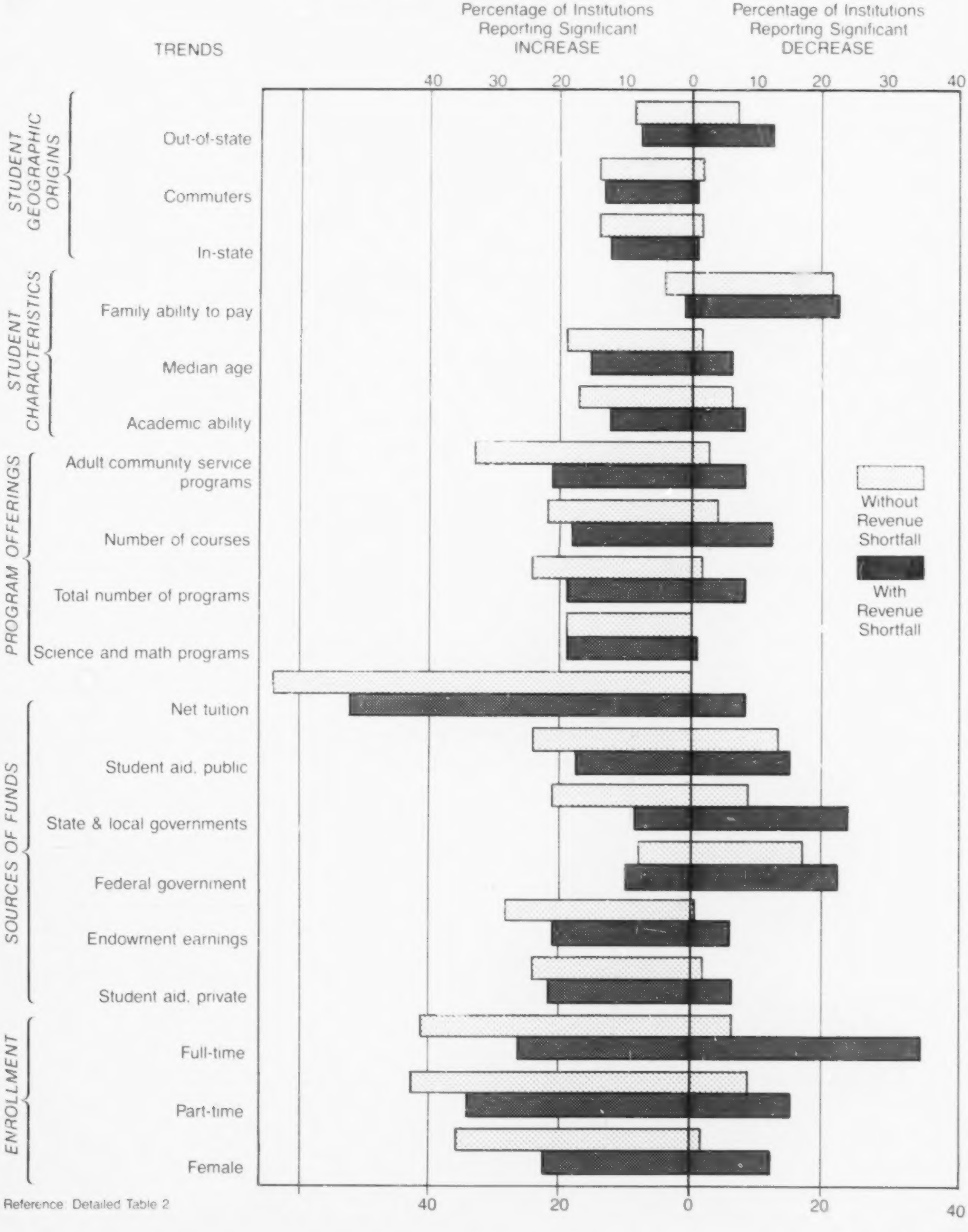
Detailed table 3 shows all of the strategies that the questionnaire listed and the percentage of institutions that reported using them. It also shows the distribution of the ratings for each of the strategies.

Few of the strategies used by an appreciable number of institutions received poor ratings. Table F shows those used by at least 10 percent of the institutions with revenue shortfall that received scores of 2 or 1 (low beneficial impact) from 40 percent or more of the raters. Four of those 6 low-rated strategies involved decreases (in offerings, in student body size, in plant maintenance). This appears to complement the findings regarding highly rated strategies, most of which involved increases.

One strategy that has attracted some attention in the press is the change in an institution's selectivity regarding incoming students. Twenty percent of the

FIGURE 1

Percentage of Institutions Reporting Significant Changes in Selected Institutional Trends, by Revenue Shortfall Status, 1980 81–1983 84



Reference: Detailed Table 2

TABLE E—Highly Rated Management Strategies

Strategy	Percentage of Shortfall Institutions That Used Strategy	Percentage of High Ratings (4 or 5)[a]
Frequent Use and High Ratings		
Increased fund raising efforts	69	62
Increased student retention efforts	67	49
Increased student recruitment at *all* levels	67	62
Increased student aid grants	49	52
Decreased faculty size	45	53
Increased class size	38	61
Decreased academic support staff	38	36
Decreased general administrative support staff	36	24
Decreased maintenance support staff	35	22
Increased adult and evening classes	34	47
Moderate Use and High Ratings		
Increased student body size	33	70
Increased recruitment efforts directed at *upper level* students	22	61
Increased amount of plant maintenance	18	59
Increased size of physical plant	15	60

[a] Percentage of those institutions that experienced revenue shortfall *and* used the strategy indicated.
Reference: Table 3

shortfall institutions reported using more selective entrance requirements (see detailed table 3). Of these users, 46 percent rated the practice highly, giving it a score of 4 or 5. Twenty-eight percent gave it poor ratings (2 or 1). The use of less selective entrance requirements was reported by 7 percent of the shortfall institutions and, of these, 72 percent gave it a poor score (2 or 1). Apparently, when selectivity was changed, raising standards was seen to have a more beneficial impact on the institution's financial condition than lowering standards.

TABLE F—Low-Rated Management Strategies

Strategy	Percentage of Institutions That Used Strategy	Percentage of Low Ratings (1 or 2)[a]
Decreased amount of plant maintenance	24	45
Increased number of courses offered	21	48
Decreased student body size	19	42
Decreased number of community services	15	48
Increased support staff for maintenance	11	64
Decreased offerings of adult and evening classes	10	56

[a] Percentage of those institutions that experienced revenue shortfall *and* used the strategy.
Reference: Table 3

Management Practices

For the four-year period 1980–84, one-half or more of the institutions surveyed reported using each of the four following management practices:

- long-range planning
- program review
- cash management
- central contingency fund

About 7 out of 10 institutions employed long-range planning, program review, and cash management; only 5 out of 10 used a central contingency fund.

Table G shows the degree to which use of these practices varied by institutional type and control.

Long-range Planning. This management practice was defined as a formal process of clarifying an institution's mission, setting operating goals, and developing support plans, management controls, and evaluation mechanisms. It was used by 75 percent of the institutions. Sixty percent of the respondents were willing to rate its usefulness, giving it an average score of 3.8 on a scale from 5 (extremely useful) to 1 (not useful). The 15 percentage point difference between the users and the raters is accounted for by those in the former group who indicated their use of the practice was so recent they were not able to rate it.

Baccalaureate colleges used long-range planning the most; specialized institutions, the least (see table H).

Twenty-five percent of the institutions did not use long-range planning, although 18 percent said that they currently had it under development.

TABLE G—Selected Management Practices, by Control and Type of Institution

Control and Type of Institution	Total Number of Institutions	Percentage of Institutions That Used			
		Long-range Planning	Program Review	Cash Management	Central Contingency Fund
All institutions	3,088	75	70	73	51
Public	1,394	75	73	69	56
Private	1,694	74	67	76	47
Comprehensive	409	78	72	85	55
Baccalaureate	739	82	63	79	54
Two-year	1,311	73	68	65	52
Specialized	629	67	77	74	42

Reference: Table 4

TABLE H—Percentage of Use and Usefulness Score for Four Management Practices, by Control and Type of Institution

Management Practice/ Control and Type of Institution	Percentage Using Practice	Percentage Rating Usefulness	Average Score
Long-range Planning			
All institutions	75	60	3.8
Public	75	60	3.8
Private	74	61	3.9
Comprehensive	78	67	3.8
Baccalaureate	82	70	4.0
Two-year	73	59	3.8
Specialized	67	47	3.6
Program Review			
All institutions	70	64	3.9
Public	73	67	3.8
Private	67	61	3.9
Comprehensive	72	62	3.9
Baccalaureate	65	56	3.8
Two-year	68	63	3.9
Specialized	77	77	3.8
Cash Management			
All institutions	73	70	4.1
Public	69	67	4.2
Private	76	72	4.1
Comprehensive	85	77	4.3
Baccalaureate	79	75	4.2
Two-year	65	62	4.2
Specialized	74	74	3.8
Central Contingency Fund			
All institutions	51	48	3.8
Public	56	55	3.8
Private	47	42	3.8
Comprehensive	55	52	4.1
Baccalaureate	54	52	3.6
Two-year	52	51	3.8
Specialized	42	33	3.7

Reference: Tables 4, 5, and 6.

Program Review. This management practice was defined as a process for periodically reviewing present and expected demand for all programs. Seven out of 10 institutions used it and 64 percent rated it, giving it an average score of 3.9.

Table H shows that there was essentially no variation in average usefulness scores when responding institutions were categorized by control and type.

A greater proportion of public institutions used program review than did private colleges and universities. Specialized institutions used it most frequently; baccalaureate colleges, least.

Thirty percent of the institutions did not use the practice, including 14 percent that had it under development.

Cash Management. This management practice was defined as a formal means of reviewing cash flow needs periodically. It was used by 73 percent of the surveyed institutions and 70 percent rated it, giving it good marks for usefulness. Its average score of 4.1 was the highest shown for any of the four practices.

Reliance on cash management was reported more frequently by private institutions than by public.

Table H shows its use was greatest among comprehensive colleges and universities. It was used least frequently by the two-year colleges, perhaps because many such institutions belong to systems that control institutional finances centrally, and the survey questionnaire was answered at the campus level. The two-year institutions that did use the practice gave it a high score for usefulness.

Twenty-seven percent of the institutions did not use cash management, including 7 percent that indicated they were considering its use.

Central Contingency Fund. This least widely used management practice was defined as a general fund from which various institutional cost centers may draw when current operating needs exceed budgets.

Just over half of the institutions included in the survey used it. Forty-eight percent were willing to rate it, and they gave it an average score of 3.8, but with a rather wide dispersion of scores. One-third rated it "extremely useful" (a score of 5); however, one-eighth gave it low (1 or 2) scores (see detailed table 6).

A larger proportion of public than private institutions used such a fund—56 percent in contrast to 47 percent. Just over half of the comprehensive, baccalaureate, and two-year institutions used and rated the practice; only one-third of the specialized institutions did (see table H).

Forty-nine percent of the institutions did not use the practice, including 4 percent that had it under development.

Management Practices and Revenue Shortfall

Figure 2 relates the use of these management practices to the institutions' revenue shortfall status. It shows that institutions without shortfall were more likely to have used three of the practices than institutions with shortfall.

The two practices involving the management of funds showed the greatest variation. Cash management, for example, was used by 77 percent of the no-shortfall institutions in contrast to 68 percent of the shortfall institutions. A central contingency fund was used by 55 percent of the no-shortfall institutions, but by only 46 percent of those with deficits.

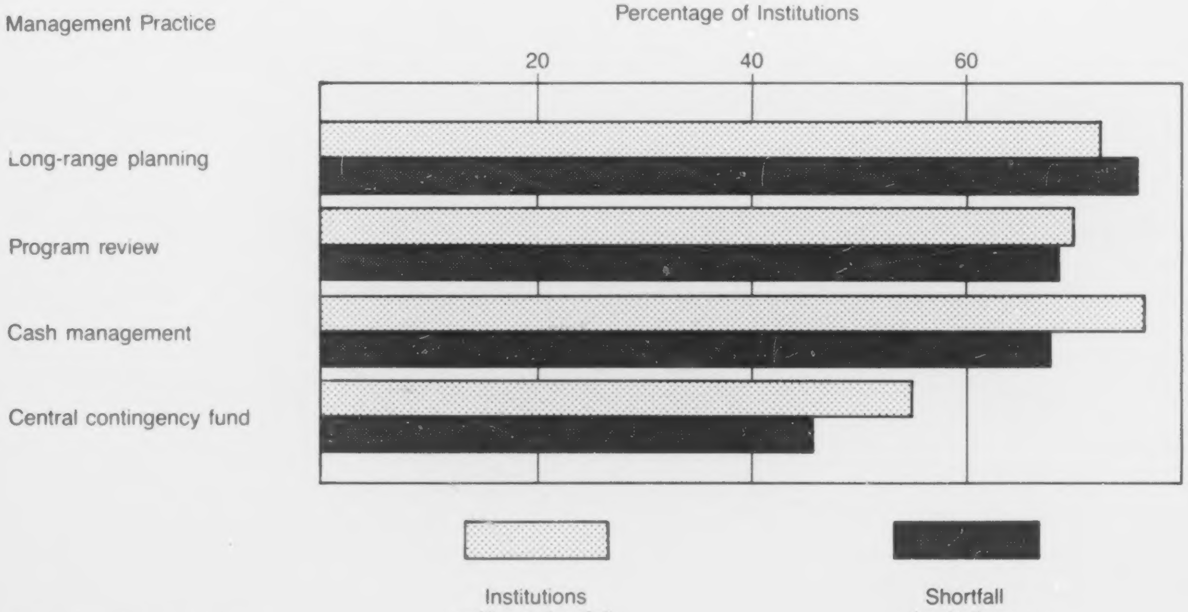
The two practices involving planning and program review did not show such distinct differences. There was practically no difference between the two groups' use of program review—69 versus 70 percent. And a slightly larger percentage of the institutions with shortfall (76 percent) reported using long-range planning than the no-shortfall institutions (73 percent).

Five-year Outlook

The expectation of doing better in the next five years than in the past four was reported by nearly 44 percent of the institutions. Thirty percent expected to have difficulty maintaining their current operating levels unless adaptive actions were taken. The remaining quarter expected to be able to maintain their current operating levels without undertaking any new major strategies (see table I).

Fewer public than private institutions expected to do better; a slightly smaller proportion of private than

FIGURE 2
Use of Management Practices,
by Revenue Shortfall Status



Reference: Detailed Table 4

TABLE I—Five-year Outlook, by Control and Type of Institution

Control and Type of Institution	Number	Percentage[a] of Institutions That Expect to			
		Do Better	Maintain Activity	Have Difficulty	No Opinion
All institutions	3,088	44	25	30	1
Public	1,394	40	26	32	2
Private	1,694	47	24	29	—
Comprehensive	409	35	28	37	—
Baccalaureate	739	50	22	28	—
Two-year	1,311	38	27	33	2
Specialized	629	54	22	24	—
No shortfall	1,691	41	36	23	—
With shortfall	1,397	47	12	39	2

[a]Percentages sum across to 100.
Reference: Table 8

TABLE J—Comparison of Use of Management Practices, by Five-year Outlook and Control and Type of Institution

Control and Type of Institution	Expect to DO BETTER & Use Long-range Planning	Expect DIFFICULTY & Use Long-range Planning	Expect to DO BETTER & Use Cash Management	Expect DIFFICULTY & Use Cash Management	Expect to DO BETTER & Use Program Review	Expect DIFFICULTY & Use Program Review	Expect to DO BETTER & Use Central Contingency Fund	Expect DIFFICULTY & Use Central Contingency Fund
All institutions	63%	52%	74%	62%	68%	52%	51%	50%
Public	67	47	76	60	75	52	60	58
Private	61	55	73	64	63	52	44	42
Comprehensive	75	58	74	87	64	56	37	64
Baccalaureate	67	77	74	77	61	54	54	62
Two-year	69	43	74	46	73	44	62	47
Specialized	48	36	73	64	72	68	37	35

Reference: Table 7

public institutions expected to have difficulty in the next 5 years. Specialized institutions showed the highest proportion of those expecting to do better. That institutional type also had the smallest share expecting difficulties. Comprehensive institutions reported the lowest proportion expecting to do better and the highest expecting to have difficulties (see table I).

Of the no-shortfall institutions, 2 out of 5 expect to do better in the next five years. About the same proportion expect to maintain their current operating levels, and 1 in 5 expect to have difficulty. This is in contrast to those that experienced revenue shortfalls. Nearly half of them expect to do better, one- eighth expect to maintain their current levels, but two-fifths expect to have difficulty (see table I). Thus, the proportion of institutions expecting difficulty is almost twice as great among those that have had deficits than among those that have not.

One might anticipate that a high proportion of those institutions expecting to do better would be users of the four management practices identified in this survey. One might also expect that a low percentage of institutions expecting trouble would be using the management practices. Table J shows these expectations confirmed to a limited degree, when national totals are considered. Sixty-three percent of the institutions expecting to do better reported using long-range planning long enough to be able to evaluate its utility. Only 52 percent of those expecting difficulty used the practice to the same extent. Similar differences appear among users of cash management and program review. But no differences appear regarding the use of a central contingency fund. Half of the institutions expecting to do better use it, as do half of the institutions expecting difficulty in the near future.

Among the two-year colleges, use of the management practices appeared more frequently among institutions expecting to do better. Three-fifths to three-quarters of this group used the management practices. In contrast, less than half of the institutions expecting difficulty did.

However, use of one of the four management practices is not always more frequent among institutions expecting to do better. Whereas two-thirds of the baccalaureate colleges that expected to do better reported using long-range planning, three-quarters of those expecting difficulties used the technique. Only about half of the baccalaureate colleges expecting to do better used a central contingency fund, whereas three-fifths of those expecting difficulty did.

In more cases than not, however, use of the management practice is more frequent among institutions expecting to do better than among those expecting difficulties.

SUMMARY

Significant changes in the four-year period, 1980/81–1983/84, have been limited to relatively few areas and institutions, in the views of senior academic administrators. Less than a third of the survey respondents indicated significant change in a variety of measures concerning student characteristics, finance, and program. About half of the institutions reported significant changes in enrollment and nearly two-thirds reported changes in net tuition.

Over the same four years, nearly half of the nation's institutions have experienced revenue shortfall. All types of institutions experienced this condition with generally the same degree of severity. Private institutions more frequently attributed the revenue shortfall to reduced enrollment than did the public institutions. The latter, however, frequently cited a reduction of external funding, including moneys from state sources, as the cause of their revenue problem.

More than half of the institutions with revenue shortfall reported that they increased activities related to the recruiting and retention of students and to fund-raising. However, these activities were the only strategies on a list of 38 that were used by a majority of the shortfall institutions.

Three specific management practices—long-range planning, program review, and cash management—were used by about 7 of every 10 institutions. A fourth, the use of a central contingency fund, was reported by only half of the institutions. Each of the practices received high marks for usefulness from three-fifths or more of the users.

Looking to the future, over two-fifths of the nations' colleges and universities expect to do better in the next five years than they did in the recent past; one-quarter expect to maintain their current operating levels without implementing major initiatives. But a little more than one-quarter of the institutions expect to have difficulty in the near term unless they take adaptive action. Despite concerns about the viability of private institutions and their future, a slightly higher percentage of such colleges than public institutions expect to do better.

DETAILED STATISTICAL TABLES

Readers should note that some percentage distributions in the following tables may not total to 100 because of weighting and rounding.

TABLE 1—Recent Trends, by Control of Institution

Trend Item		All Institutions	Public Institutions	Private Institutions
(Number of institutions)		**(3,088)**	**(1,394)**	**(1,694)**
Enrollment				
Full-time		100.0	100.0	100.0
	Increase	34.2	32.0	36.1
	Decrease	19.3	20.6	18.2
	No change	46.4	47.4	45.7
Part-time		100.0	100.0	100.0
	Increase	38.9	44.8	34.1
	Decrease	11.9	15.7	8.7
	No change	49.2	39.5	57.2
Female		100.0	100.0	100.0
	Increase	28.3	29.7	27.2
	Decrease	6.9	5.3	8.1
	No change	64.8	65.0	64.7
Sources of funds				
Net tuition		100.0	100.0	100.0
	Increase	58.5	56.3	60.4
	Decrease	3.7	3.8	3.6
	No change	37.8	40.0	36.0
Student aid from all public sources		100.0	100.0	100.0
	Increase	20.8	21.6	20.2
	Decrease	13.9	10.3	16.9
	No change	65.2	68.1	62.8
State and local governments (except student aid)		100.0	100.0	100.0
	Increase	15.5	21.9	10.2
	Decrease	15.6	24.5	8.3
	No change	68.9	53.6	81.5
Federal government (except student aid)		100.0	100.0	100.0
	Increase	8.9	12.1	6.3
	Decrease	20.0	23.9	16.8
	No change	71.0	63.9	76.9
Endowment earnings		100.0	100.0	100.0
	Increase	24.5	16.6	31.0
	Decrease	3.1	2.3	3.8
	No change	72.4	81.1	65.2
Student aid from all private sources		100.0	100.0	100.0
	Increase	22.7	18.7	25.9
	Decrease	3.6	3.3	3.7
	No change	73.8	77.9	70.3

Continued on next page.

TABLE 1—Continued
Recent Trends, by Control of Institution

Trend Item		All Institutions	Public Institutions	Private Institutions
Program offerings				
Number of adult and community service programs		100.0	100.0	100.0
	Increase	27.4	35.6	20.7
	Decrease	5.1	7.9	2.7
	No change	67.6	56.6	76.6
Number of courses		100.0	100.0	100.0
	Increase	20.3	19.7	20.7
	Decrease	7.3	9.9	5.2
	No change	72.4	70.4	74.1
Total number of programs		100.0	100.0	100.0
	Increase	22.0	17.7	25.5
	Decrease	4.6	7.7	2.1
	No change	73.4	74.7	72.4
Number of science and mathematics programs		100.0	100.0	100.0
	Increase	19.0	22.1	16.4
	Decrease	0.6	0.3	0.8
	No change	80.5	77.6	82.8
Student characteristics				
Family ability to pay		100.0	100.0	100.0
	Increase	2.3	3.3	1.5
	Decrease	22.3	14.1	29.0
	No change	75.4	82.6	69.5
Median age		100.0	100.0	100.0
	Increase	17.8	16.9	18.4
	Decrease	3.4	3.1	3.7
	No change	78.8	80.0	77.8
Academic ability		100.0	100.0	100.0
	Increase	14.2	7.9	19.4
	Decrease	6.9	7.6	6.3
	No change	78.9	84.5	74.3
Students' geographic origins				
Out-of-state students		100.0	100.0	100.0
	Increase	8.5	5.9	10.6
	Decrease	8.9	8.0	9.7
	No change	82.6	86.1	79.7
Commuter students		100.0	100.0	100.0
	Increase	13.2	7.5	17.9
	Decrease	1.6	1.4	1.8
	No change	85.2	91.1	80.3
In-state students		100.0	100.0	100.0
	Increase	12.9	7.3	17.6
	Decrease	1.5	1.1	1.8
	No change	85.6	91.6	80.6

TABLE 2—Recent Trends, by Revenue Shortfall Status and Control of Institution

Trend Item		All Institutions		Public Institutions		Private Institutions	
		No Shortfall	With Shortfall	No Shortfall	With Shortfall	No Shortfall	With Shortfall
Number of institutions		1,691	1,397	705	689	986	708
Enrollment							
Full-time		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	40.6	26.6	41.1	22.3	40.0	30.7
	Decrease	5.7	35.8	12.7	28.8	0.8	42.6
	No change	53.7	37.7	45.9	48.9	59.2	26.7
Part-time		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	43.4	33.5	54.5	35.0	35.5	32.2
	Decrease	9.2	15.2	8.9	22.7	9.3	7.8
	No change	47.4	51.3	36.6	42.3	55.2	60.0
Female		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	33.2	22.4	36.3	22.9	31.0	21.9
	Decrease	2.4	12.2	1.2	9.6	3.3	14.8
	No change	64.4	65.4	62.6	67.5	65.7	63.3
Sources of funds							
Net tuition		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	63.7	52.3	62.2	50.2	64.7	54.4
	Decrease	0.0	8.1	0.0	7.7	0.0	8.6
	No change	36.3	39.6	37.8	42.2	35.3	37.0
Student aid from all public sources		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	23.8	17.2	28.6	14.4	20.4	19.9
	Decrease	13.3	14.8	8.0	12.7	17.7	16.8
	No change	62.9	68.0	63.4	72.9	62.5	63.3
State and local governments (except student aid)		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	20.6	9.3	34.4	9.1	10.7	9.5
	Decrease	8.9	23.8	9.7	39.7	8.3	8.3
	No change	70.5	66.9	55.9	51.3	81.0	82.2
Federal government (except student aid)		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	7.7	10.4	9.8	14.5	6.3	6.4
	Decrease	17.2	23.4	24.7	23.2	11.9	23.6
	No change	75.0	66.2	65.6	62.3	81.8	70.0
Endowment earnings		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	27.8	20.5	16.7	16.6	35.8	24.3
	Decrease	0.4	6.4	0.7	4.0	0.2	8.8
	No change	71.8	73.1	82.6	79.4	64.0	66.9
Student aid from all private sources		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	23.6	21.5	20.5	17.0	25.9	26.0
	Decrease	1.8	5.7	2.1	4.5	1.5	6.8
	No change	74.6	72.8	77.4	78.5	72.6	67.2

Continued on next page.

TABLE 2—Continued
Recent Trends, by Revenue Shortfall Status and Control of Institution

Trend Item		All Institutions		Public Institutions		Private Institutions	
		No Shortfall	With Shortfall	No Shortfall	With Shortfall	No Shortfall	With Shortfall
Program offerings							
Number of adult and community service programs		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	33.0	20.6	43.6	27.3	25.4	14.1
	Decrease	3.0	7.6	4.7	11.2	1.8	4.1
	No change	64.1	71.8	51.7	61.5	72.9	81.8
Number of courses		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	22.2	17.8	26.4	13.0	19.3	22.6
	Decrease	3.7	11.7	3.7	16.2	3.6	7.4
	No change	74.1	70.4	69.9	70.9	77.1	70.0
Total number of programs		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	24.2	19.2	27.3	7.8	22.1	30.3
	Decrease	2.2	7.5	2.8	12.6	1.8	2.6
	No change	73.6	73.3	69.9	79.6	76.2	67.1
Number of science & mathematics programs		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	19.3	18.6	22.5	21.6	16.9	15.7
	Decrease	0.0	1.3	0.0	0.7	0.0	1.8
	No change	80.7	80.2	77.5	77.7	83.1	82.5
Student characteristics							
Family ability to pay		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	3.6	0.7	5.2	1.3	2.5	0.0
	Decrease	21.6	23.1	10.4	17.9	29.6	28.2
	No change	74.8	76.2	84.4	80.8	67.9	71.8
Median age		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	19.4	15.8	19.6	14.3	19.2	17.3
	Decrease	1.6	5.6	4.0	2.1	0.0	8.9
	No change	79.0	78.6	76.5	83.6	80.8	73.8
Academic ability		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	16.5	11.5	10.6	5.1	20.7	17.6
	Decrease	5.7	8.2	7.3	7.9	4.6	8.5
	No change	77.8	80.3	82.1	87.0	74.7	73.8
Students' geographic origins							
Out-of-state students		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	9.3	7.5	3.5	8.4	13.4	6.7
	Decrease	6.8	11.5	4.0	12.1	8.8	10.8
	No change	83.9	81.0	92.5	79.5	77.7	82.5
Commuter students		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	13.5	12.8	9.6	5.3	16.3	20.1
	Decrease	2.1	1.0	1.6	1.1	2.5	0.8
	No change	84.4	86.2	88.8	93.6	81.2	79.1
In-state students		100.0	100.0	100.0	100.0	100.0	100.0
	Increase	14.0	11.7	9.4	5.1	17.3	18.0
	Decrease	1.8	1.1	0.8	1.5	2.5	0.8
	No change	84.2	87.2	89.8	93.4	80.3	81.2

TABLE 3—Percentage of Use and Ratings of Selected Management Strategies

Institutions Reporting Shortfall: N = 1,397

Management Strategy	Percentage of Institutions That Used & Rated the Strategy	Percentage of Rating Institutions That Gave Strategy a— High Rating 5	4	3	2	Low Rating 1
Faculty						
1. Increased faculty size	15.4	9	34	24	11	22
2. Decreased faculty size	44.5	10	42	34	10	4
3. Increased faculty compensation	30.9	1	33	27	10	29
4. Decreased faculty compensation	9.9	24	40	15	17	4
5. Increased academic support staff	12.2	3	34	35	15	13
6. Decreased academic support staff	37.9	12	24	36	23	6
Academic programs						
7. Increased number of programs	25.9	8	39	31	18	4
8. Decreased number of programs	24.6	7	34	38	18	3
9. Increased number of courses	20.8	5	35	13	25	22
10. Decreased number of courses	29.4	13	31	32	18	6
11. Increased class size	38.4	19	41	31	8	1
12. Decreased class size	2.7	21	34	32	13	—
13. More selective entrance requirements	20.2	2	44	26	21	7
14. Less selective entrance requirements	7.1	—	13	15	52	20
15. Increased number of community services	22.9	3	46	36	10	5
16. Decreased number of community services	14.7	2	13	37	36	12
17. Increased number of adult and evening classes	34.4	9	38	39	10	4
18. Decreased number of adult and evening classes	9.9	3	21	20	21	35
Student body						
19. Increased student body size	32.8	36	34	21	8	1
20. Decreased student body size	18.8	6	30	22	19	23
21. Increased number of student aid grants from institutional funds	48.6	9	43	29	8	11
22. Fewer student aid grants from institutional funds	4.6	49	—	33	6	12
23. Increased recruitment efforts directed at *all student levels*	66.6	25	36	28	4	7
24. Decreased recruitment efforts directed at *all student levels*	3.9	—	29	57	—	14
25. Increased recruitment efforts directed at upper division students	22.0	19	42	28	8	3
26. Reduced recruitment efforts directed at upper division students	2.4	—	77	—	—	23
27. Increased student retention efforts	67.3	25	24	38	9	4
28. Decreased student retention efforts	3.6	32	—	—	—	68

Continued on next page.

TABLE 3—Continued
Percentage of Use and Ratings of Selected Management Strategies

Institutions Reporting Shortfall: N = 1,397

Management Strategy	Percentage of Institutions That Used & Rated the Strategy	Percentage of Rating Institutions That Gave Strategy a—				
		High Rating 5	4	3	2	Low Rating 1
General administration						
29. Increased support staff for general administration	17.0	2	42	19	18	19
30. Decreased support staff for general administration	36.0	9	15	53	20	3
31. Increased size of physical plant	14.8	16	44	23	13	4
32. Reduced size of physical plant	5.5	14	31	36	19	—
33. Increased support staff for plant maintenance	11.3	—	8	29	56	7
34. Decreased support staff for plant maintenance	34.8	13	9	42	31	5
35. Increased amount of plant maintenance	17.7	5	54	11	28	2
36. Decreased amount of plant maintenance	24.3	7	14	34	31	14
37. Increased effort devoted to fund raising	68.6	27	35	27	9	2
38. Decreased effort devoted to fund raising	4.9	—	29	60	—	11

TABLE 4—Use of Selected Management Practices, by Revenue Shortfall Status and Reason for Shortfall

		Institutions with--		Reasons for Shortfall		
Management Practice	All Institutions	No Shortfall	Shortfall	Reduced External Funds	Reduced Enrollment	Costs
All institutions (N)	**(3,088)**	**(1,691)**	**(1,397)**	**(768)**	**(822)**	**(1,034)**
Long-range planning	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	60.3	60.4	60.3	68.0	55.4	57.0
Used but too early to rate	14.3	12.8	16.0	13.8	21.9	17.4
Under development	18.4	18.2	18.7	13.0	18.1	20.3
Do not use	7.0	8.6	5.1	5.2	4.7	5.3
Program review	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	63.8	65.9	61.2	63.0	66.5	60.6
Used but too early to rate	5.7	4.0	7.8	6.6	9.9	8.6
Under development	14.0	14.5	13.5	17.0	7.6	11.2
Do not use	16.4	15.6	17.5	13.4	16.0	19.6
Cash management	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	69.8	74.1	64.5	66.8	65.5	62.6
Used but too early to rate	3.1	2.6	3.8	1.0	4.5	3.1
Under development	6.9	4.5	9.8	7.4	11.6	13.3
Do not use	20.2	18.9	21.9	24.8	18.4	21.1
Central contingency fund	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	47.7	51.9	42.6	52.6	44.9	39.7
Used but too early to rate	3.0	2.8	3.3	1.9	5.6	4.4
Under development	3.7	2.0	5.9	4.6	5.9	7.3
Do not use	45.6	43.3	48.2	40.8	43.6	48.5

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TABLE 4—Continued
Use of Selected Management Practices, by Revenue Shortfall Status and Reason for Shortfall

		Institutions with—		Reasons for Shortfall		
Management Practice	All Institutions	No Shortfall	Shortfall	Reduced External Funds	Reduced Enrollment	Costs
Public Institutions (N)	**(1,394)**	**(705)**	**(689)**	**(564)**	**(320)**	**(448)**
Long-range planning	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	60.0	55.4	64.6	65.3	60.0	57.6
Used but too early to rate	15.2	15.2	15.1	14.9	21.3	19.2
Under development	15.7	17.0	14.4	15.4	11.5	17.0
Do not use	9.1	12.3	5.9	4.4	7.2	6.2
Program review	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	67.0	70.4	63.5	65.6	67.8	60.6
Used but too early to rate	5.6	3.7	7.6	8.3	8.7	7.7
Under development	13.9	11.6	16.2	15.0	6.5	15.0
Do not use	13.5	14.3	12.8	11.1	16.9	16.7
Cash management	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	67.0	64.2	69.8	70.7	59.6	67.4
Used but too early to rate	1.8	2.5	1.1	1.4	1.7	1.2
Under development	4.1	4.4	2.8	1.8	7.0	5.9
Do not use	27.1	28.9	25.2	26.0	31.6	25.5
Central contingency fund	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	55.3	47.6	63.2	59.6	74.7	64.9
Used but too early to rate	0.4	0.9	0.0	0.0	0.0	0.0
Under development	1.1	1.1	1.2	1.4	0.8	1.8
Do not use	43.1	50.4	35.7	39.0	24.5	33.3
Private Institutions (N)	**(1,694)**	**(986)**	**(708)**	**(205)**	**(502)**	**(587)**
Long-range planning	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	60.6	63.9	56.0	75.6	52.4	56.5
Used but too early to rate	13.5	11.1	16.8	10.8	22.3	16.0
Under development	20.7	19.0	22.9	6.2	22.3	22.8
Do not use	5.2	5.9	4.3	7.3	3.0	4.7
Program review	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	61.2	62.8	59.1	55.9	65.7	60.6
Used but too early to rate	5.8	4.2	8.0	1.8	10.6	9.3
Under development	14.2	16.5	10.9	22.6	8.2	8.3
Do not use	18.8	16.5	22.0	19.8	15.5	21.8
Cash management	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	72.1	81.1	59.4	55.9	69.2	58.9
Used but too early to rate	4.2	2.6	6.3	0.0	6.4	4.5
Under development	9.2	4.6	15.7	22.6	14.5	18.9
Do not use	14.6	11.7	18.6	21.4	9.9	17.7
Central contingency fund	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	41.5	55.0	22.6	33.4	25.9	20.4
Used but too early to rate	5.1	4.1	6.5	7.3	9.1	7.8
Under development	5.8	2.6	10.4	13.5	9.2	11.6
Do not use	47.6	38.3	60.5	45.8	55.8	60.1

TABLE 5—Use of Selected Management Practices, by Revenue Shortfall Status and Type of Institution

		Institutions with	
Management Practice	All Institutions	No Shortfall	Shortfall
Comprehensive institutions (N)	**(409)**	**(187)**	**(222)**
Long-range planning	**100.0**	**100.0**	**100.0**
Used and rated	66.6	57.4	74.3
Used, but too early to rate	11.4	9.8	12.8
Under development	10.0	13.1	7.4
Do not use	12.0	19.6	5.6
Program review	**100.0**	**100.0**	**100.0**
Used and rated	61.8	56.5	66.3
Used, but too early to rate	9.9	6.1	13.2
Under development	12.2	15.1	9.8
Do not use	16.0	22.3	10.7
Cash management	**100.0**	**100.0**	**100.0**
Used and rated	77.2	86.0	69.8
Used, but too early to rate	7.4	5.8	8.7
Under development	4.9	5.6	4.3
Do not use	10.5	2.6	17.3
Central contingency fund	**100.0**	**100.0**	**100.0**
Used and rated	52.4	59.3	46.6
Used, but too early to rate	2.9	3.3	2.6
Under development	2.7	0.0	5.0
Do not use	41.9	37.4	45.8
Baccalaureate institutions (N)	**(739)**	**(422)**	**(317)**
Long-range planning	**100.0**	**100.0**	**100.0**
Used and rated	70.2	72.4	67.2
Used, but too early to rate	12.0	10.3	14.2
Under development	13.4	12.4	14.6
Do not use	4.5	4.8	4.0
Program review	**100.0**	**100.0**	**100.0**
Used and rated	56.2	50.8	63.4
Used, but too early to rate	8.5	10.3	6.1
Under development	12.7	14.4	10.4
Do not use	22.5	24.4	20.1
Cash management	**100.0**	**100.0**	**100.0**
Used and rated	75.3	76.8	73.3
Used, but too early to rate	3.6	4.6	2.4
Under development	7.0	4.6	10.1
Do not use	14.1	14.0	14.2
Central contingency fund	**100.0**	**100.0**	**100.0**
Used and rated	52.2	64.8	35.4
Used, but too early to rate	1.7	3.0	0.0
Under development	5.2	0.0	12.0
Do not use	41.0	32.2	52.6

Continued on next page.

TABLE 5—Continued
Use of Selected Management Practices, by Revenue Shortfall Status and Type of Institution

		Institutions with	
Management Practice	All Institutions	No Shortfall	Shortfall
Two-year institutions (N)	**(1,311)**	**(723)**	**(588)**
Long-range planning	**100.0**	**100.0**	**100.0**
Used and rated	59.2	56.8	62.2
Used, but too early to rate	13.7	15.3	11.7
Under development	18.8	17.0	20.9
Do not use	8.3	10.9	5.2
Program review	**100.0**	**100.0**	**100.0**
Used and rated	62.6	66.5	57.7
Used, but too early to rate	5.3	1.8	9.7
Under development	17.1	16.7	17.6
Do not use	15.0	15.0	15.0
Cash management	**100.0**	**100.0**	**100.0**
Used and rated	62.4	62.4	62.3
Used, but too early to rate	3.0	1.8	4.4
Under development	7.7	6.4	9.4
Do not use	26.9	29.4	23.9
Central contingency fund	**100.0**	**100.0**	**100.0**
Used and rated	51.0	43.9	59.7
Used, but too early to rate	1.0	1.8	0.0
Under development	0.8	1.1	0.4
Do not use	47.2	53.2	39.9
Specialized institutions (N)	**(629)**	**(360)**	**(269)**
Long-range planning	**100.0**	**100.0**	**100.0**
Used and rated	46.9	54.9	36.3
Used, but too early to rate	20.0	12.5	30.0
Under development	29.1	29.9	28.1
Do not use	4.0	2.8	5.5
Program review	**100.0**	**100.0**	**100.0**
Used and rated	76.7	87.4	62.2
Used, but too early to rate	0.6	0.0	1.3
Under development	10.3	9.8	11.1
Do not use	12.4	2.8	25.3
Cash management	**100.0**	**100.0**	**100.0**
Used and rated	73.8	88.2	34.7
Used, but too early to rate	0.0	0.0	0.0
Under development	6.4	0.0	14.9
Do not use	19.8	11.8	30.4
Central contingency fund	**100.0**	**100.0**	**100.0**
Used and rated	32.7	49.2	10.6
Used, but too early to rate	8.8	4.2	14.9
Under development	8.8	7.0	11.1
Do not use	49.8	39.6	63.4

TABLE 6—Usefulness Ratings of Selected Management Practices, by Control and Type of Institution

Management Practice	Number of Institutions That Used & Rated the Strategy	Percentage of Rating Institutions That Gave The Practice a— High Rating 5	4	3	2	Low Rating 1	Average Score
All institutions							
Long-range planning	1,863	27	35	33	4	1	3.8
Program review	1,971	25	42	29	5	<1	3.9
Cash management	2,154	39	41	17	3	1	4.1
Central contingency fund	1,474	34	27	27	10	3	3.8
Public institutions							
Long-range planning	836	27	32	33	6	2	3.8
Program review	934	26	37	31	5	<1	3.8
Cash management	934	40	39	18	3	1	4.2
Central contingency fund	771	31	26	31	11	1	3.8
Private institutions							
Long-range planning	1,027	27	37	32	3	1	3.9
Program review	1,038	23	46	27	4	0	3.9
Cash management	1,221	38	42	15	3	1	4.1
Central contingency fund	703	37	27	22	9	5	3.8
Comprehensive institutions							
Long-range planning	272	26	34	32	8	0	3.8
Program review	253	24	44	30	1	2	3.9
Cash management	316	49	38	11	3	0	4.3
Central contingency fund	215	41	28	30	0	2	4.1
Baccalaureate institutions							
Long-range planning	519	38	31	27	4	0	4.0
Program review	416	31	26	38	5	0	3.8
Cash management	556	44	34	19	4	0	4.2
Central contingency fund	385	33	25	16	24	2	3.6
Two-year institutions							
Long-range planning	777	27	34	31	4	3	3.8
Program review	820	29	37	31	4	0	3.9
Cash management	818	45	37	13	5	1	4.2
Central contingency fund	668	31	30	30	8	1	3.8
Specialized institutions							
Long-range planning	295	10	44	46	1	0	3.6
Program review	482	12	62	19	8	0	3.8
Cash management	465	15	57	24	0	3	3.8
Central contingency fund	206	37	19	32	0	12	3.7

Note: Percentages may not sum across to 100 because of rounding.

TABLE 7—Five-year Outlook and Use of Selected Management Practices, by Control and Type of Institution

	Institutions That in the Next Five Years Expect to—				
Management Practice	Do Better	Maintain Current Levels	Have Difficulties	No Opinion	Total
All institutions (N)	**(1,352)**	**(776)**	**(932)**	**(29)**	**(3,088)**
Long-range planning	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	63.3	64.9	51.5	82.1	60.3
Used, but too early to rate	16.9	6.6	17.3	0.0	14.3
Under development	15.7	17.3	23.4	17.9	18.4
Do not use	4.1	11.2	7.9	0.0	7.0
Program review	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	68.3	69.5	51.9	82.1	63.8
Used, but too early to rate	4.9	3.4	9.0	0.0	5.7
Under development	11.7	15.7	16.0	17.9	14.0
Do not use	15.1	11.4	23.1	0.0	16.4
Cash management	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	73.7	71.0	62.0	100.0	69.8
Used, but too early to rate	1.4	5.0	4.2	0.0	3.1
Under development	5.8	3.2	11.8	0.0	6.9
Do not use	19.1	20.8	22.0	0.0	20.2
Central contingency fund	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	50.6	39.2	49.6	82.1	47.7
Used, but too early to rate	4.8	3.6	0.0	0.0	3.0
Under development	5.3	0.0	4.6	0.0	3.7
Do not use	39.3	57.2	45.8	17.9	45.6

Continued on next page.

TABLE 7—Continued
Five-year Outlook and Use of Selected Management Practices, by Control and Type of Institution

	Institutions That in the Next Five Years Expect to—				
Management Practice	Do Better	Maintain Current Levels	Have Diffi-culties	No Opinion	Total
Public Institutions (N)	**(550)**	**(365)**	**(442)**	**(29)**	**(1,394)**
Long-range planning	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	67.2	62.8	47.1	82.1	60.0
Used, but too early to rate	13.7	7.8	24.1	0.0	15.2
Under development	13.7	18.2	16.1	17.9	15.7
Do not use	5.5	11.2	12.7	0.0	9.1
Program review	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	75.4	71.5	51.6	82.1	67.0
Used, but too early to rate	6.3	1.3	8.7	0.0	5.6
Under development	10.9	11.4	19.4	17.9	13.9
Do not use	7.4	15.8	20.3	0.0	13.5
Cash management	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	75.5	59.9	59.8	100.0	67.0
Used, but too early to rate	0.0	5.5	1.2	0.0	1.8
Under development	4.0	1.7	6.4	0.0	4.1
Do not use	20.4	32.9	32.5	0.0	27.1
Central contingency fund	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	59.8	42.8	58.2	82.1	55.3
Used, but too early to rate	1.1	0.0	0.0	0.0	0.4
Under development	2.4	0.0	0.6	0.0	1.1
Do not use	36.8	57.2	41.2	17.9	43.1
Private institutions (N)	**(793)**	**(411)**	**(490)**	**(0)**	**(1,694)**
Long-range planning	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	60.6	66.8	55.4	0.0	60.6
Used, but too early to rate	19.1	5.5	11.2	0.0	13.5
Under development	17.1	16.6	29.8	0.0	20.7
Do not use	3.2	11.1	3.5	0.0	5.2
Program review	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	63.4	67.8	52.2	0.0	61.2
Used, but too early to rate	4.0	5.2	9.3	0.0	5.8
Under development	12.2	19.5	12.9	0.0	14.2
Do not use	20.5	7.5	25.6	0.0	18.8
Cash management	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	72.5	80.8	64.0	0.0	72.1
Used, but too early to rate	2.3	4.5	6.8	0.0	4.2
Under development	7.1	4.5	16.6	0.0	9.2
Do not use	18.1	10.1	12.6	0.0	14.6
Central contingency fund	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	44.2	35.9	41.8	0.0	41.5
Used, but too early to rate	7.4	6.8	0.0	0.0	5.1
Under development	7.4	0.0	8.2	0.0	5.8
Do not use	41.0	57.3	50.0	0.0	47.6

Continued on next page.

TABLE 7—Continued
Five-year Outlook and Use of Selected Management Practices, by Control and Type of Institution

	Institutions That in the Next Five Years Expect to—				
Management Practice	Do Better	Maintain Current Levels	Have Difficulties	No Opinion	Total
Comprehensive institutions (N)	**(143)**	**(117)**	**(150)**	**(0)**	**(409)**
Long-range planning	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	75.0	67.8	57.5	0.0	66.6
Used, but too early to rate	15.6	7.4	10.7	0.0	11.4
Under development	1.7	6.3	20.8	0.0	10.0
Do not use	7.7	18.6	11.0	0.0	12.0
Program review	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	63.5	67.0	56.2	0.0	61.8
Used, but too early to rate	8.1	11.9	10.1	0.0	9.9
Under development	19.3	0.0	15.0	0.0	12.2
Do not use	9.1	21.1	18.6	0.0	16.0
Cash management	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	74.2	68.3	87.1	0.0	77.2
Used, but too early to rate	4.0	16.3	3.6	0.0	7.4
Under development	4.0	10.2	1.6	0.0	4.9
Do not use	17.8	5.3	7.7	0.0	10.5
Central contingency fund	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	36.7	56.5	64.3	0.0	52.4
Used, but too early to rate	8.3	0.0	0.0	0.0	2.9
Under development	7.8	0.0	0.0	0.0	2.7
Do not use	47.2	43.5	35.7	0.0	41.9
Baccalaureate institutions (N)	**(375)**	**(160)**	**(204)**	**(0)**	**(739)**
Long-range planning	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	66.5	70.4	76.8	0.0	70.2
Used, but too early to rate	14.4	4.7	13.2	0.0	12.0
Under development	12.4	20.1	9.9	0.0	13.4
Do not use	6.8	4.7	0.0	0.0	4.5
Program review	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	60.8	47.8	54.4	0.0	56.2
Used, but too early to rate	11.0	4.7	7.0	0.0	8.5
Under development	5.4	33.4	9.9	0.0	12.7
Do not use	22.8	14.2	28.7	0.0	22.5
Cash management	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	74.4	75.3	76.8	0.0	75.3
Used, but too early to rate	3.4	4.2	3.7	0.0	3.6
Under development	8.6	8.0	3.3	0.0	7.0
Do not use	13.6	12.5	16.2	0.0	14.1
Central contingency fund	**100.0**	**100.0**	**100.0**	—	**100.0**
Used and rated	53.9	35.8	61.8	0.0	52.2
Used, but too early to rate	3.4	0.0	0.0	0.0	1.7
Under development	10.2	0.0	0.0	0.0	5.2
Do not use	32.5	64.2	38.2	0.0	41.0

Continued on next page.

TABLE 7—Continued
Five-year Outlook and Use of Selected Management Practices, by Control and Type of Institution

	Institutions That in the Next Five Years Expect to—				
Management Practice	Do Better	Maintain Current Levels	Have Difficulties	No Opinion	Total
Two-year institutions (N)	**(492)**	**(359)**	**(431)**	**(29)**	**(1,311)**
Long-range planning	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	68.5	64.0	42.5	82.1	59.2
Used, but too early to rate	14.8	5.5	20.2	0.0	13.7
Under development	14.2	14.5	27.6	17.9	18.8
Do not use	2.5	15.2	9.8	0.0	8.3
Program review	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	73.2	68.9	43.8	82.1	62.6
Used, but too early to rate	2.1	1.3	12.7	0.0	5.3
Under development	10.5	19.0	22.9	17.9	17.1
Do not use	14.2	10.7	20.6	0.0	15.0
Cash management	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	73.8	63.6	45.8	100.0	62.4
Used, but too early to rate	0.0	3.6	6.0	0.0	3.0
Under development	3.2	0.0	19.9	0.0	7.7
Do not use	23.0	32.8	28.4	0.0	26.9
Central contingency fund	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Used and rated	61.7	38.4	47.2	82.1	51.0
Used, but too early to rate	0.0	3.6	0.0	0.0	1.0
Under development	1.6	0.0	0.6	0.0	0.8
Do not use	36.8	58.0	52.2	17.9	47.2
Specialized institutions (N)	**(342)**	**(140)**	**(148)**	**(0)**	**(629)**
Long-range planning	**100.0**	**100.0**	**100.0**	**—**	**100.0**
Used and rated	47.5	56.6	36.4	0.0	46.9
Used, but too early to rate	23.2	10.7	21.4	0.0	20.0
Under development	27.2	30.7	32.1	0.0	29.1
Do not use	2.1	2.0	10.1	0.0	4.0
Program review	**100.0**	**100.0**	**100.0**	**—**	**100.0**
Used and rated	71.7	98.0	67.9	0.0	76.7
Used, but too early to rate	1.1	0.0	0.0	0.0	0.6
Under development	16.9	0.0	4.9	0.0	10.3
Do not use	10.3	2.0	27.2	0.0	12.4
Cash management	**100.0**	**100.0**	**100.0**	**—**	**100.0**
Used and rated	72.7	87.3	63.6	0.0	73.8
Used, but too early to rate	0.0	0.0	0.0	0.0	0.0
Under development	7.4	0.0	10.1	0.0	6.4
Do not use	19.9	12.7	26.3	0.0	19.8
Central contingency fund	**100.0**	**100.0**	**100.0**	**—**	**100.0**
Used and rated	36.9	30.7	34.7	0.0	32.7
Used, but too early to rate	11.8	10.7	0.0	0.0	8.8
Under development	4.4	0.0	27.2	0.0	8.8
Do not use	47.0	58.6	48.0	0.0	49.8

TABLE 8—Percentage Distribution of Institutions, by Five-year Outlook and Revenue Shortfall Status

	Percentage of Institutions That in the Next Five Years Expect to				
Shortfall Status	Do Better	Maintain Current Levels	Have Difficulties	No Opinion	Total
All institutions	**43.8**	**25.1**	**30.2**	**0.9**	**100.0**
No shortfall	41.1	36.0	22.6	0.3	100.0
Shortfall	47.0	11.9	39.4	1.7	100.0
Public institutions	**40.1**	**26.2**	**31.7**	**2.1**	**100.0**
No shortfall	39.8	35.8	23.6	0.7	100.0
Shortfall	40.4	16.3	39.9	3.4	100.0
Private institutions	**46.8**	**24.3**	**28.9**	**0.0**	**100.0**
No shortfall	42.0	36.2	21.8	0.0	100.0
Shortfall	53.5	7.6	38.9	0.0	100.0
Comprehensive institutions	**34.9**	**28.5**	**36.6**	**0.0**	**100.0**
No shortfall	22.0	41.1	36.8	0.0	100.0
Shortfall	45.7	17.9	36.4	0.0	100.0
Baccalaureate institutions	**50.8**	**21.6**	**27.6**	**0.0**	**100.0**
No shortfall	36.9	34.7	28.3	0.0	100.0
Shortfall	69.1	4.2	26.7	0.0	100.0
Two-year institutions	**37.6**	**27.4**	**32.9**	**2.2**	**100.0**
No shortfall	40.0	40.0	19.3	0.7	100.0
Shortfall	34.6	11.9	49.5	4.0	100.0
Specialized institutions	**54.3**	**22.2**	**23.5**	**0.0**	**100.0**
No shortfall	58.1	26.9	14.9	0.0	100.0
Shortfall	49.2	15.9	34.9	0.0	100.0

Note: Percentages may not sum across to 100 because of rounding.

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
ONE DUPONT CIRCLE
WASHINGTON, D. C. 20036

HIGHER EDUCATION PANEL
(202) 833-4757

April 10, 1984

Dear Higher Education Panel Representative:

About a year ago, the president of your institution agreed to let it participate in the American Council on Education's Higher Education Panel (HEP). The Panel is described in the attached blue folder. This letter and its enclosures present your first opportunity to take part in a Panel survey.

The attached HEP Survey No. 63, "Conditions Affecting College and University Financial Strength," is sponsored by the U.S. Department of Education. Its purpose is to obtain a broad assessment of what has been happening at institutions in the recent past and what they have been doing to sustain themselves.

The survey springs from a continuing concern on the part of educational policy-makers about the financial implications of the changes in demographic, economic, and managerial conditions that have occurred in the last four years. This is a study of how institutional officials assess the changes, and how their institutions have responded.

You will note that this survey does not ask for quantities of statistics. Instead, it requests that an official indicates in general terms what significant changes have occurred at the institution, what the institution's response has been, and what its immediate future is expected to look like. Ideally, the respondent should be one at a relatively high administrative level with a broad view of both the academic and financial aspects of the institution. We will rely on your good judgment to identify the appropriate respondent on your campus.

Please understand that your institution's response will be protected to the maximum extent permissible by law. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identifiable with your institution. This survey is authorized by the National Science Foundation Act of 1950, as amended. Although you are not required to respond, your cooperation is needed to make the results comprehensive, reliable, and timely.

Please have the completed questionnaire returned to us by May 4. A preaddressed envelope is enclosed for your convenience. If you have any questions or problems, please do not hesitate to telephone us collect at 202/833-4757.

Sincerely,
Frank J. Atelsek
Frank J. Atelsek
Panel Director

Enclosures

AMERICAN COUNCIL ON EDUCATION

OMB #3145-0009
Exp. 03/31/87

American Council on Education
Higher Education Panel Survey No. 63

CONDITIONS AFFECTING COLLEGE AND UNIVERSITY FINANCIAL STRENGTH

Introduction

There is wide concern that a large number of colleges and universities may be in financial distress due in part to demographic changes, economic conditions and perhaps even management strategies and decisions. These are not new problems and some would argue they are never ending. This Higher Education Panel survey will review not only what is currently happening in institutions, but also what institutions have been doing over the past four years to sustain themselves. The findings will be particularly useful to Department of Education policy makers to determine what actions should be taken at the Federal level.

You will note that the questionnaire does not request quantities of statistical data; it asks for opinions, impressions, and judgments concerning recent changes at your institution. Terms such as "significant," "useful," and "beneficial" have *not* been reduced to specific percentage changes or other quantitative measures. A three percent change at one institution may be insignificant, while at another, it could be very important. We are relying on your assessment of the conditions at your institution and a belief that there are generally understood limits to the meaning of these terms. It is suggested that a "significant change" is one that influences decision-making. This opinion-oriented, impressionistic quality of the results will, of course, be reflected in the survey report.

Definitions

Definitions used in the Department of Education's Higher Education General Information Survey (HEGIS) are to apply for standard terms not defined below.

Cash Management Program. This is a formal plan of reviewing cash flow needs on a periodic (daily, weekly, monthly, and/or yearly) basis. It should consider cash flow by fund type and may include cash flow by cost center. It includes a system of controls by various receipts and cost categories.

Central Contingency Fund. This is a general fund upon which various institutional cost centers or areas may draw when budgeted amounts fall short of current operating needs.

Long-Range Planning Activity. This involves a formal process of clarifying the institutional mission; setting institutional long-range operating goals; developing supporting management, operational and financial plans; implementing appropriate management controls; and setting up both an evaluation mechanism to provide for follow-up activities and a feedback mechanism for the development of future operating plans.

Program Review. This is a formal process, conducted not less than on an annual basis, through which the institution reviews the present and expected demand (enrollments) for all programs and courses of study. While course content and expected enrollments are of primary concern, expected revenues are also considered, along with resource needs. From this activity, program priorities are established and potential growth areas are identified, as are areas for reduction or elimination.

Revenue Shortfall. This is the excess of current expenditures over current revenues from all sources.

I. Recent Trends.

A. How has your institution changed over the past four academic years, i.e., 1980/81–1983/84? Check the column that applies.

	Significant Increase	Significant Decrease	No Significant Change
1. Student Enrollments			
a. Full-time	☐	☐	☐
b. Part-time	☐	☐	☐
c. Female	☐	☐	☐
2. Student Characteristics			
a. Median age	☐	☐	☐
b. Academic ability	☐	☐	☐
c. Family ability to pay	☐	☐	☐
3. Institutional Offerings			
a. Total number of programs	☐	☐	☐
b. Number of science and mathematics programs	☐	☐	☐
c. Number of adult/community service programs	☐	☐	☐
d. Number of courses	☐	☐	☐
4. Student Geographic Origins			
a. Commuters	☐	☐	☐
b. In-state	☐	☐	☐
c. Out-of-state	☐	☐	☐

B. What changes have occurred over the past four fiscal years (1980/81–1983/84) in the amounts your institution has received *in current dollars* from the sources listed below?

Source	Significant Increase	Significant Decrease	No Significant Change
1. Federal (except student aid)	☐	☐	☐
2. Other public, i.e., state and local (except student aid)	☐	☐	☐
3. Net tuition (tuition and fees less institutional student aid)	☐	☐	☐
4. Student financial aid from all public sources	☐	☐	☐
5. Student financial aid from all private sources	☐	☐	☐
6. Endowment earnings	☐	☐	☐

II. Management Practices and Strategies.

A. MANAGEMENT PRACTICES. See Definitions for an explanation of each of the four management practices listed below. If you answer yes to any of the items, indicate your estimate of the practice's usefulness by circling the appropriate number on the scale to the right.

	Extremely Useful				Not Useful	Too Early to Assess
1. Does your institution have an ongoing *long-range planning activity?*						
______ No.						
______ No, but such a practice is currently under development.						
______ Yes. If yes, indicate your estimate of its usefulness.	5	4	3	2	1	9
2. Does your institution have an ongoing formal process of *program review?*						
______ No.						
______ No, but such a practice is currently under development.						
______ Yes. If yes, indicate your estimate of its usefulness.	5	4	3	2	1	9
3. Does your institution have an ongoing *cash management* program?						
______ No.						
______ No, but such a practice is currently under development.						
______ Yes. If yes, indicate your estimate of its usefulness.	5	4	3	2	1	9
4. Does your institution have a *central contingency fund?*						
______ No.						
______ No, but such a fund is currently under development.						
______ Yes. If yes, indicate your estimate of its usefulness.	5	4	3	2	1	9

B. REVENUE SHORTFALL. Have you had revenue shortfall(s) during the 1980/81–1983/84 period?

______ No. If no, go to question III on last page.

______ Yes. If yes, to what significant causes were the shortfalls due?
Check all that apply.

______ Reduced external funding, including reduced revenue from the state.

______ Enrollment shortfalls.

______ Increased costs.

C. INSTITUTIONAL STRATEGIES. If you answered yes to the preceding question, please complete the following items. Listed below are a number of strategies that institutions sometimes use to increase revenue, decrease costs, or change programs to attract additional students. For each strategy, *either* put a check mark in the "NOT USED" box *or,* if your institution used the strategy *in the past four academic years* (1980/81–1983/84), indicate, by circling the appropriate number, your estimate of the effect of the strategy on improving your institution's financial condition.

Strategy	NOT USED	USED; a ***beneficial impact*** on the institution's financial condition is estimated to be:					USED, but too early to assess
		High				Low	
Faculty							
1. Increased faculty size	☐	5	4	3	2	1	9
2. Decreased faculty size	☐	5	4	3	2	1	9
3. Increased faculty compensation	☐	5	4	3	2	1	9
4. Decreased faculty compensation	☐	5	4	3	2	1	9
5. Increased the academic support staff (secretarial services, library staff, etc.)	☐	5	4	3	2	1	9
6. Decreased the academic support staff (secretarial services, library staff, etc.)	☐	5	4	3	2	1	9
Academic Programs							
7. Increased number of programs offered	☐	5	4	3	2	1	9
8. Decreased number of programs offered	☐	5	4	3	2	1	9
9. Increased number of courses offered	☐	5	4	3	2	1	9
10. Decreased number of courses offered	☐	5	4	3	2	1	9
11. Increased class size	☐	5	4	3	2	1	9
12. Decreased class size	☐	5	4	3	2	1	9
13. More selective entrance requirements	☐	5	4	3	2	1	9
14. Less selective entrance requirements	☐	5	4	3	2	1	9
15. Increased number of community services	☐	5	4	3	2	1	9
16. Decreased number of community services	☐	5	4	3	2	1	9
17. Increased number of adult & evening classes	☐	5	4	3	2	1	9
18. Decreased number of adult & evening classes	☐	5	4	3	2	1	9
Student Body							
19. Increased student body size	☐	5	4	3	2	1	9
20. Decreased student body size	☐	5	4	3	2	1	9
21. Increased number of student aid grants from institutional funds	☐	5	4	3	2	1	9
22. Fewer student aid grants from institutional funds	☐	5	4	3	2	1	9
23. Increased recruitment efforts directed at *all student levels*	☐	5	4	3	2	1	9
24. Decreased recruitment efforts directed at *all student levels*	☐	5	4	3	2	1	9
25. Increased recruitment efforts directed at upper division students	☐	5	4	3	2	1	9
26. Reduced recruitment efforts directed at upper division students	☐	5	4	3	2	1	9
27. Increased student retention efforts	☐	5	4	3	2	1	9
28. Decreased student retention efforts	☐	5	4	3	2	1	9

(Continued on next page.)

II. C. INSTITUTIONAL STRATEGIES, Continued

Strategy	NOT USED	USED; a *beneficial impact* on the institution's financial condition is estimated to be: High				Low	USED, but too early to assess
General Administration							
29. Increased support staff for general administration	☐	5	4	3	2	1	9
30. Decreased support staff for general administration	☐	5	4	3	2	1	9
31. Increased size of physical plant	☐	5	4	3	2	1	9
32. Reduced size of physical plant	☐	5	4	3	2	1	9
33. Increased support staff for plant maintenance	☐	5	4	3	2	1	9
34. Decreased support staff for plant maintenance	☐	5	4	3	2	1	9
35. Increased amount of plant maintenance	☐	5	4	3	2	1	9
36. Decreased amount of plant maintenance	☐	5	4	3	2	1	9
37. Increased effort devoted to fund-raising	☐	5	4	3	2	1	9
38. Decreased effort devoted to fund-raising	☐	5	4	3	2	1	9
39. Other; specify.							
______________________	☐	5	4	3	2	1	9
______________________	☐	5	4	3	2	1	9

III. Five-year Outlook.

Given the mission of your institution and the expected availability of students and resources, how would you rate your institution's chances of maintaining itself over the 1983/84–1987/88 period at a level consistent with current operations?

☐ We expect to do better than we have done in the last four years.
☐ We expect to be able to maintain our current operating levels without the introduction of any new major strategies.
☐ We expect to have difficulty maintaining our current operating levels unless we take adaptive actions.
☐ No opinion.

Thank you for your assistance. Please return this form by **May 4, 1984** to:

Higher Education Panel
American Council on Education
One Dupont Circle Suite 829
Washington, DC 20036

Please keep a copy of this survey for your records.
Person completing form:

Name ______________________

Title ______________________

Telephone (   ) ______________________

If you have any questions or problems concerning this survey, please call the HEP staff collect at (202) 833-4757.

APPENDIX B: TECHNICAL NOTES

Questionnaires for this survey were mailed to 438 institutions on April 10, 1984. Excluded from the survey universe were research universities whose complex administrative structures made meaningful responses to several key questionnaire items virtually impossible for them to provide. After mail and telephone follow-up efforts were conducted in May and June, data gathering was cut off on July 3, 1984, at which time the response rate had reached 84 percent.

Stratification Design

Table B-1 shows the stratification design for the survey and indicates the responses for each of the institutional strata included.

TABLE B-1—Stratification Design

Cell	Type of Institution	Enrollment	Population	Respondents
	Total		3,088	370
3	Large public comprehensive	[a]	92	38
4	Large private comprehensive	[a]	27	11
5	Large public specialized	[a]	33	12
6	Large private specialized	[a]	18	5
7	Large public two-year	[a]	43	17
8	Public comprehensive	5,500-8,999	56	18
9	Public comprehensive	<5,500	108	22
10	Private comprehensive	<9,000	126	22
11	Public baccalaureate	<9,000	127	19
12	Private baccalaureate	1,350-8,999	166	22
13	Private baccalaureate	<1,350	446	35
14	Public specialized	<9,000	36	5
15	Private religious	<9,000	303	12
16	Private specialized	<9,000	239	16
17	Public two-year academic/comprehensive	6,000-8,999	55	16
18	Public two-year academic/comprehensive	4,000-5,999	72	14
19	Public two-year academic/comprehensive	2,000-3,999	155	20
20	Public two-year academic/comprehensive	<2,000	333	21
21	Private two-year academic/comprehensive	<9,000	129	10
22	Public two-year occupational	2,500-8,999	63	13
23	Public two-year occupational	<2,500	221	18
24	Private two-year occupational	<9,000	240	9

[a] Institutions with total full-time-equivalent (FTE) 1981 enrollment greater than 8,999 and/or FTE 1981 graduate enrollment greater than 749 and/or FY 1979 educational and general expenditures of $35 million or more.

Weighting

The weighting technique used was the standard one employed for Panel surveys. Data received from Panel members were adjusted for item and institutional nonresponse within each cell. Then institutional weights were applied to bring Panel data up to the estimates representative of the national population.

Comparison of Respondents and Nonrespondents

Table B-2 compares the survey respondents and nonrespondents against several variables. Response rates that were 5 percent or more greater than the overall average were recorded by private comprehensive and baccalaureate institutions and by those in the Midwest. Relatively low response rates—those that were 95 percent or less of the overall average—were shown by private two-year and public specialized institutions and by institutions in the East.

TABLE B-2—Comparison of Respondents and Nonrespondents:
(In percentages)

Institutional Characteristics	Respondents (N = 370)	Nonrespondents (N = 68)	Response Rate
Total	100.0	100.0	84.5
Control			
Public	61.6	66.2	83.5
Private	38.4	33.8	86.1
Type and control			
Public comprehensive	19.7	19.1	84.9
Private comprehensive	8.9	5.9	89.2
Public baccalaureate	5.1	4.4	86.4
Private baccalaureate	15.4	10.3	89.1
Public two-year	32.3	35.2	83.2
Private two-year	5.1	7.4	79.2
Public specialized	4.6	7.4	77.3
Private specialized	8.9	10.3	82.5
Region			
East	21.9	33.8	77.9
Midwest	26.5	16.2	89.9
South	32.2	29.4	85.6
West	19.5	20.6	83.7
Total undergraduate full-time-equivalent enrollment (1981)			
Less than 1,000	26.5	29.4	83.1
1,000-4,999	44.9	44.1	84.7
5,000-9,999	18.9	19.1	84.3
10,000 and above	16.0	7.4	87.8

Other Reports of the Higher Education Panel
American Council on Education

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Robert H. Atwell, President

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The Higher Education Panel is a survey research program established by the Council for the purpose of securing policy-related information quickly from representative samples of colleges and universities. *Higher Education Panel Reports* are designed to expedite communication of the Panel's survey findings to policy-makers in government, in the associations, and in educational institutions across the nation.

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1.22

Engineering Programs in Emerging Areas, 1983–84

Engin Inel Holmstrom
Janice Petrovich

Higher Education Panel Reports
Number 64 November 1985

American Council on Education
Washington, DC 20036

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Finally, we wish to acknowledge that the early stages of this survey were conducted under the guidance of Frank J. Atelsek, the Higher Education Panel's Director until his untimely death in May 1985.

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HIGHLIGHTS

General

- In 1983–84, there were about 470 operational programs in emerging engineering areas (i.e., computers, materials, microelectronics, robotics, manufacturing, and biotechnology), averaging nearly four programs per institution.
- The most numerous were programs in computers, followed by microelectronics, and materials. The least numerous were programs in biotechnology, followed by manufacturing.
- These programs employed over 4,060 faculty, averaging nearly nine faculty per program. Compared to total faculty in engineering programs, the faculty in emerging programs were somewhat junior in rank although nearly one-half were full professors. One-fifth of the total faculty had non-U.S. bachelor's degrees. There were more foreign-trained faculty among the junior than senior ranks.
- Programs enrolled about 7,500 doctoral students, averaging just over 16 students per program. Nearly one-half were non-U.S. citizens.
- Seventy percent of the programs were in public institutions. Public and private programs employed relatively similar numbers of faculty, but private programs enrolled more doctoral students than did public programs.
- About one-half of the programs were located in the 50 institutions ranking highest in doctoral production as well as in the top 50 in terms of research expenditures. Programs in these institutions tended to have larger numbers of faculty and doctoral students than did programs in other institutions.
- Although three-quarters of the programs in emerging engineering areas engaged in faculty recruitment activities during 1983–84, over one-half reported faculty shortages.
- Nearly 30 percent of the programs reported that non-U.S. citizens comprised over one-half of their faculty applicant pool. The most important source of qualified applicants for faculty positions was the pool of new doctorates from U.S. institutions.

Program Highlights

- **Biotechnology:** 58 programs, averaging seven faculty and 12 doctoral students, with private programs having more doctoral students than public programs. Three-fifths of programs report faculty shortages. Lowest proportion of non-U.S. citizens among faculty, faculty applicant pool, and students.
- **Computers:** The most numerous with 96 programs, averaging 12 faculty and 20 doctoral students. Private programs larger than public programs. Heavy faculty recruiting in 1983–84; the least likely to report shortages with only 32 percent indicating unfilled faculty positions. Compared to other programs, more non-U.S. citizens among faculty, faculty applicant pool, and students.
- **Manufacturing:** 59 programs, averaging eight faculty and eight doctoral students. Fewer than half report faculty shortages. Relatively large concentration of non-U.S. citizens among faculty, faculty applicant pool, and students. Nearly three-fifths of doctoral students are non-U.S. citizens.
- **Materials:** 86 programs, averaging 11 faculty and 28 doctoral students. More likely than others to be housed in private institutions. Programs in private institutions and in the top 50 institutions by research expenditures much larger than programs in other institutions. Heaviest concentration of full professors among faculty (62 percent). Heavy faculty shortages with 80 percent of programs reporting unfilled faculty positions. Relatively few non-U.S. citizens among faculty, faculty applicant pool, and doctoral students.
- **Microelectronics:** 86 programs, averaging eight faculty and 15 doctoral students. Private programs larger than public programs. Over one-half of the doctoral students are non-U.S. citizens. Heavy faculty recruitment in 1983–84, but over two-fifths still report faculty shortages.
- **Robotics:** 64 programs, averaging five faculty and seven doctoral students. Somewhat more likely to be housed in public institutions than other programs. Over one-half report faculty shortages.

BACKGROUND

The importance of engineering in the development of technology is widely acknowledged. Recognizing that much of the nation's economic, technological, and industrial leadership hinges on the innovations and technologies provided by the engineering profession, the National Science Foundation has been devoting special attention to engineering education. The availability of qualified faculty, the scope and number of engineering programs, and the production of doctorates are among the subjects that have been studied.

Colleges of engineering have been establishing new programs in a number of emerging areas that have applications in production and manufacturing. Although previous surveys have documented some shortages of faculty in major engineering fields, information on emerging areas has not been available. A primary purpose of this survey is to provide reliable baseline data on faculty, programs, and students in selected and rapidly developing engineering specialties. These include, for purposes of this study: computers, materials, microelectronics, robotics, manufacturing, and biotechnology programs.

The term "program" was defined as "an organized instructional activity leading to the Ph.D., Sc.D., or equivalent degree." The programs could be administered either separately or as areas of concentration within established departments in engineering schools.

The study population was defined as all institutions of higher education that granted at least one doctorate in engineering in 1981–82 and offered doctoral programs in emerging areas. Of 142 institutions that granted doctorates, 19 reported no activity in any of the emerging areas, reducing the study population to 123. The national estimates presented in this report are derived from responses obtained from 96 institutions (78 percent response rate). Respondents included deans of engineering schools who completed the first section of the survey questionnaire, providing data on the number and type of emerging programs, and program heads who provided detailed information on faculty and students. A copy of the survey questionnaire is presented in Appendix A. A description of the survey procedures, including sampling and weighting, is found in Appendix B (Methods Summary) and Appendix C (Technical Notes).

The survey was designed to provide information on the availability of qualified faculty, including the supply of doctoral students, in emerging engineering areas. Institutions were asked to report the total number of faculty recruitments in progress and completed during the 1983–84 academic year and to indicate the sources of qualified applicants and their citizenship.

The report presents national estimates for the programs, faculty, and doctoral students. It presents information on organization and location of these programs. Whenever relevant, comparisons are made between programs located in public institutions and those in private institutions. Information is also presented for programs in the top 50 institutions that granted the largest number of doctoral degrees in engineering in 1981–82 as well as the top 50 ranked highest in terms of research expenditures in that year. (Twenty-five institutions of higher education appear on both lists. See detailed tables 1 and 2 presented after the text for lists of top 50 institutions.)

Readers are reminded that the national estimates presented in this report may underestimate the number of programs, faculty, and doctoral students involved in emerging engineering areas.The survey population consisted only of programs located in engineering departments. The report does not contain information on programs administered by other departments or schools, such as, computer programs in computer science departments and biotechnology programs in schools of medicine. Moreover, information was requested only for those *full-time, regular* faculty employed by the institution who were involved in the emerging programs in one capacity or another. Some programs may hire large numbers of adjunct faculty—such as personnel from industry in manufacturing or materials programs—who are not accounted for in this report.

FINDINGS

Program Organization and Location

In 1983–84, the doctorate-granting colleges of engineering had about 470 operational programs in emerging areas, averaging nearly four programs per institution. They also had about 30 authorized but non-operational programs (see detailed table 2).

Public institutions administered 70 percent of the operational programs (see table A). The 50 institutions that granted the largest number of doctoral degrees in engineering had about half of the programs, as did the 50 institutions with the largest research expenditures.

TABLE A—Percentage Distribution of Programs in Emerging Areas in Engineering, by Control and Top 50 Status of Institutions

		Control		Top 50 by Degrees Conferred		Top 50 by Research Expenditures	
Program Area	(N)	Public	Private	Top 50	Other	Top 50	Other
Total	(467)	70	30	48	52	51	49
Biotechnology	(58)	72	28	48	52	51	49
Computers	(96)	69	31	48	52	48	52
Manufacturing	(59)	78	22	53	47	56	44
Materials	(86)	64	36	46	54	50	50
Microelectronics	(86)	69	31	46	54	48	52
Robotics	(64)	75	25	50	50	56	44
Other	(19)	68	32	37	63	47	53

Reference: Detailed tables 2 and 3

Computer programs were the most numerous of all the programs in emerging areas, comprising 21 percent of all the programs, followed by microelectronics (18 percent) and materials (18 percent); biotechnology was one of the least numerous, comprising only 12 percent of the programs (see figure 1 and table B). Nineteen miscellaneous programs were categorized as "other" and include programs in laser holography, hydrology/hydraulics, transportation, construction management, hazardous wastes, ocean engineering, and industrial and management systems.

Sixty-three percent of the institutions responding to the survey reported that they had doctoral programs in at least three of the emerging engineering areas; 22 percent had programs in all six areas. A list of institutions offering doctoral programs in emerging engineering areas appears in detailed table 4.

Programs in emerging engineering areas are often administered by different departments at different institutions. There are some general trends, however, in the departmental distribution of specific programs. Biotechnology programs are most likely to be administered by departments of chemical engineering, followed by departments of bioengineering/biomedical engineering, and electrical engineering. Programs in computers are usually located in departments of electrical engineering or computer engineering/computer science. Materials programs tend to be housed in departments of mechanical engineering, chemical engineering, and materials science and engineering, including metallurgy. Programs in manufacturing are usually found in departments of mechanical systems or industrial engineering. Finally, programs in microelectronics tend to be administered by departments of electrical engineering, and robotics programs by departments of electrical, mechanical, industrial, or aeronautical engineering.

TABLE B—Percentage Distribution of Programs in Emerging Areas in Engineering, by Control of Institution

Program Area	Total (N = 467)	Public (N = 329)	Private (N = 137)
Total programs	100	100	100
Biotechnology	12	13	11
Computers	21	20	22
Manufacturing	12	14	9
Materials	18	17	23
Microelectronics	18	18	20
Robotics	14	15	12
Other	4	4	4

Note: Percentages may not sum to 100 because of rounding.
Reference: Detailed table 2.

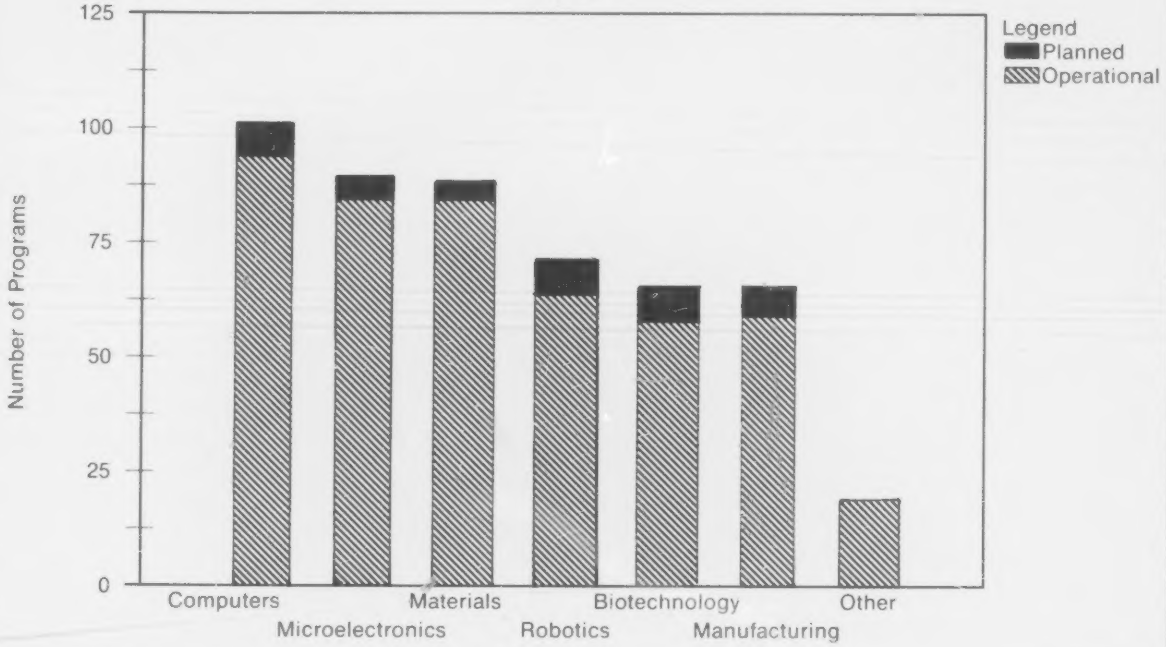


Figure 1
Doctoral Programs
in Emerging Engineering Areas,
1983

Respondents were asked to indicate other departments or units outside the engineering college that cooperate with the emerging programs. Biotechnology programs were the most likely to have cooperative arrangements with departments and units outside the engineering college. They reported 17 such cooperative efforts, eight of which were in schools of medicine. Engineering departments with computers programs were also likely to have cooperative arrangements with other computer science departments. Robotics programs were the least likely to have cooperative arrangements. Only two were reported: one with a computer science department, another with a psychology department. Most often, departments cooperating with engineering programs in emerging areas were in the natural sciences (chemistry, physics, mathematics, medicine) or business.

Within the six areas, institutions were asked to identify specific program specialties. Computer programs generally reported specializing in software design, artificial intelligence, and computer architecture. The specialties cited by materials programs included polymers, metals, and electronic materials. Microelectronics programs focused on artificial intelligence and integrated circuit fabrication. Manufacturing and robotics concentrated on computer-assisted design/computer-assisted manufacturing (CAD/CAM). Robotics also included artificial intelligence and kinematics. Biotechnology programs cited biomedical engineering and biomaterials as program specialties.

The information on program specialties within the emerging engineering areas suggests that the six areas are not mutually exclusive and that there is considerable overlap. For example, artificial intelligence was cited as an area of specialization in computers as well as in microelectronics and robotics programs.

Faculty Composition

About 4,060 faculty were employed in some 470 programs in emerging engineering areas, averaging nearly nine faculty per program (see tables C and D). Not surprisingly, the larger program areas had most of the faculty. For instance, computers which accounted for 21 percent of the programs, claimed 27 percent of the faculty, averaging 12 faculty per program. In contrast, robotics, which accounted for 14 percent of the programs, had eight percent of the faculty, averaging only five faculty per program. Computers and materials programs had more faculty than others, while robotics and biotechnology had fewer.

In general there was no difference in the average number of faculty employed in public and private programs, except in robotics which averaged nearly two more faculty in public programs than in private programs. Programs in the top 50 institutions had more faculty than programs in other institutions. For instance, programs in the 50 institutions that granted the largest number of doctorates in engineering averaged nearly three more faculty than other programs. Similarly, programs in the 50 institutions with largest research expenditures averaged nearly five more faculty than did others. Differences between programs in the top 50 and other institutions were most apparent in materials programs where the top 50 institutions had, on average, eight more faculty than programs located in other institutions.

TABLE C—Percentage Distribution of Faculty in Emerging Programs in Engineering, by Control of Institution

Program Area	Total (N = 4,062)	Public (N = 2,846)	Private (N = 1,216)
Total programs	100	100	100
Biotechnology	10	11	9
Computers	27	26	30
Manufacturing	12	14	8
Materials	22	21	26
Microelectronics	17	16	19
Robotics	8	9	5
Other	4	3	4

Note: Percentages may not sum to 100 because of rounding.
Reference: Detailed table 2

Faculty Rank. Almost half of the faculty in emerging areas held the rank of professor, about one-fourth were associate professors, and another one-fourth were assistant professors (see figure 2 and detailed table 6). The greatest concentrations of assistant professors were in computers, robotics, and manufacturing where about 30 percent of the faculty were assistant professors. In contrast, about 60 percent of the faculty in materials and in "other" programs and over half of those in microelectronics were full professors.

Degree Background. Over 20 percent of the faculty in emerging areas had bachelor's degrees from institutions outside the U.S. (see table E). There was basically little difference in the proportion of foreign-trained faculty in programs located in public and private institutions and in the top 50 institutions (see detailed table 7). One exception was in robotics programs that were located in the top 50 institutions granting engineering degrees which had a slightly higher proportion of faculty with foreign baccalaureates than did other programs. Another exception was in manufacturing programs located in the top 50 institutions with research expenditures which had a slightly lower proportion of foreign faculty than did others. The highest concentration of foreign trained faculty was in manufacturing (28 percent), followed by robotics (26 percent), microelectronics (25 percent), and computers (24 percent).

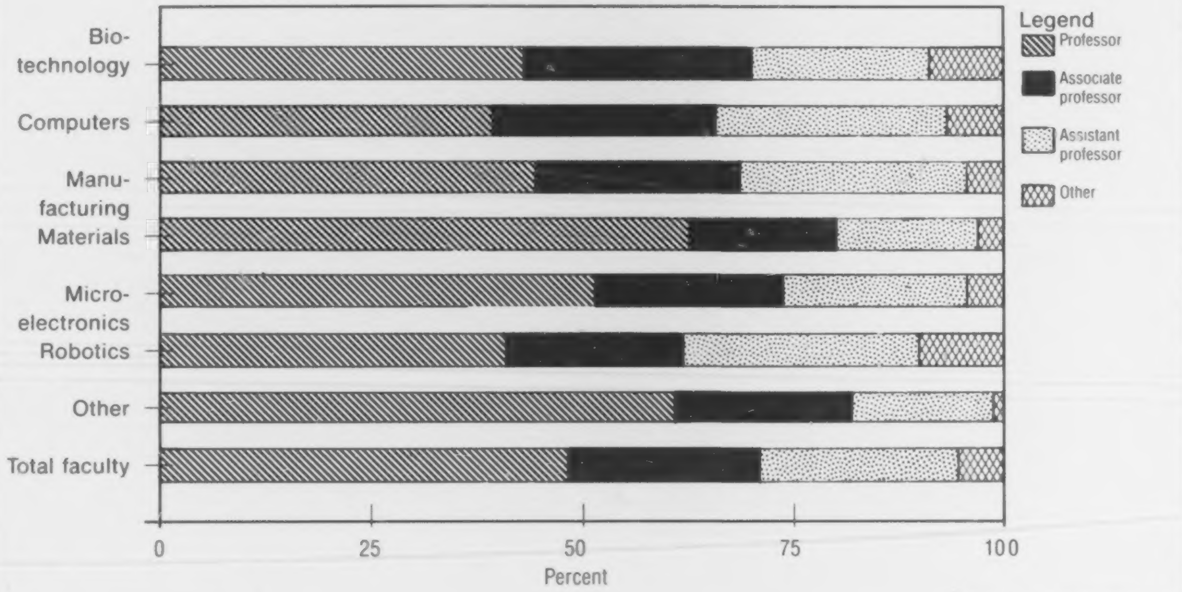
Junior faculty were more likely to have foreign backgrounds than senior faculty. Among assistant professors, the proportion with foreign training was 33 percent overall, compared to 24 percent among associate professors, and 16 percent among full professors. Academic rank distribution of foreign faculty differed somewhat by program area. For instance, nearly half the foreign-trained faculty in computers and 42 percent of those in manufacturing held the rank of assistant professor. In contrast, nearly half the foreign-trained faculty in materials and 42 percent of those in microelectronics were full professors (see figure 3).

TABLE D—Average Number of Faculty in Emerging Programs in Engineering, by Program Area, and by Control and Top 50 Status of Institution

	Institutional Control						
Program Area	Total	Public	Private	Top 50 by Engineering Degrees	Other	Top 50 by Research Expenditures	Other
Total	9	9	9	10	7	11	6
Biotechnology	7	7	7	8	6	9	5
Computers	12	11	12	13	10	14	9
Manufacturing	8	8	8	8	8	9	7
Materials	11	11	10	15	7	15	7
Microelectronics	8	8	8	9	7	11	6
Robotics	5	6	4	5	5	6	4
Other	8	7	9	9	7	10	6

Reference: Detailed tables 2, 3, and 6

Figure 2
Faculty Rank
Distribution in Emerging Areas,
by Program Area



Reference: Detailed table 5

TABLE E—Proportion of Engineering Faculty in Emerging Areas Who Hold Non-U.S. Bachelor's Degrees, by Program Area and Academic Rank

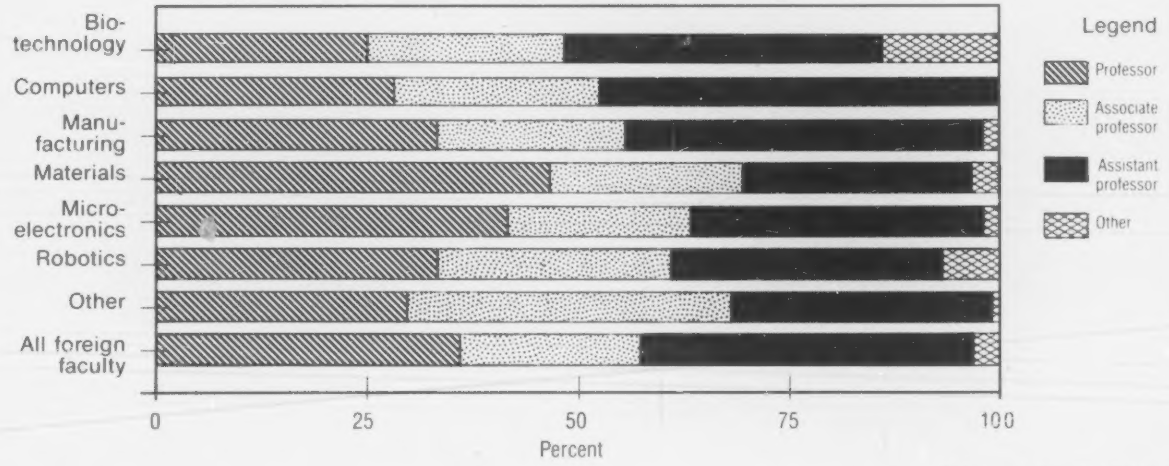
Program Area	All Faculty	Professors	Associate Professors	Assistant Professors	Other
All programs	22%	16%	24%	33%	13%
Biotechnology	13	8	11	23	24
Computers	24	17	23	36	1
Manufacturing	28	21	25	42	16
Materials	19	14	27	29	29
Microelectronics	25	20	25	39	14
Robotics	26	21	36	27	21
Other	12	6	23	19	0

Faculty Recruitment

The majority of the engineering deans indicated that availability of human resources is the major determining factor in the development of engineering programs in emerging areas (see table F). The deans of engineering schools in public institutions were more likely to endorse this statement than were deans in private institutions (90 percent versus 74 percent).

The rapid growth of programs in emerging engineering areas is evident by the fact that the staff recruited during 1983–84 accounted for 21 percent of the total engineering faculty (see table G). New faculty accounted for 28 percent of the total faculty in robotics but only 11 percent of those in biotechnology programs. Computer programs were the most likely to report faculty recruitment during 1983–84 (92 percent), followed by programs in microelectronics (85 percent), and manufacturing (80 percent). Only 31 percent of biotechnology programs tried to recruit faculty in 1983–84. The average number of faculty recruited was two, with computers programs recruiting as many as three, while biotechnology programs recruiting only one, on average.

FIGURE 3
Distribution of Engineering Faculty
Who Hold Non-U.S. Bachelor's Degrees,
by Emerging Program Area and Academic Rank



Reference: Detailed Table 7

TABLE F—Engineering Deans Who Believe that the Availability of Human Resources is the Major Determining Factor in the Development of Engineering Programs in Emerging Areas

Type of Institution	Number	Percent
Total	104	85
Public	75	90
Private	29	74
"Top 50" Degrees	46	92
Other than "Top 50" Degrees	58	80
"Top 50" in Research Dollars	43	86
Other than "Top 50" in Research Dollars	61	84
With Programs in:		
Biotechnology	52	90
Computers	82	88
Manufacturing	46	84
Materials	73	84
Microelectronics	71	86
Robotics	54	88
Other	20	89

Qualified faculty were in short supply in 1983–84. Fully half of the programs were unable to fill all the faculty positions for which they were recruiting (see figure 4). A majority of the materials, biotechnology, robotics, and "other" programs reported shortages. Computers, microelectronics, and manufacturing were less likely to report shortages than were other programs. Nonetheless, over 40 percent of the programs in manufacturing and microelectronics and over 32 percent of computers programs still reported unfilled faculty positions. Programs in private institutions were somewhat more likely to report that they were unable to fill all faculty positions than were programs in public institutions (see detailed table 8).

The survey included a question requesting information on the specialties for which the programs were not able to find faculty. Biotechnology, computers, and robotics programs reported problems in recruiting faculty specializing in artificial intelligence (see table H). Microelectronics, manufacturing, robotics, and computers programs sought applicants with knowledge of computer-assisted design (CAD) without success. These responses suggest that emerging area programs may be competing against each other for persons with similar expertise.

Respondents were asked to indicate from a list of eight statements the two most important sources of qualified applicants for faculty positions in their programs. The most important source for faculty positions in emerging areas was the pool of new doctorates from U.S. institutions (see detailed table 9). The second-ranked source cited by all program areas, except microelectronics, was faculty from other U.S. institutions. In microelectronics, doctorate holders coming from U.S. industry were cited as the second-ranked source of qualified applicants for faculty positions.

Non-U.S. citizens constituted a substantial proportion of the qualified faculty applicant pool in some

FIGURE 4

Number of Programs Recruiting Faculty in Emerging Engineering Areas in 1983–84 and Number of Programs Unable to Fill All Faculty Positions, by Program Area

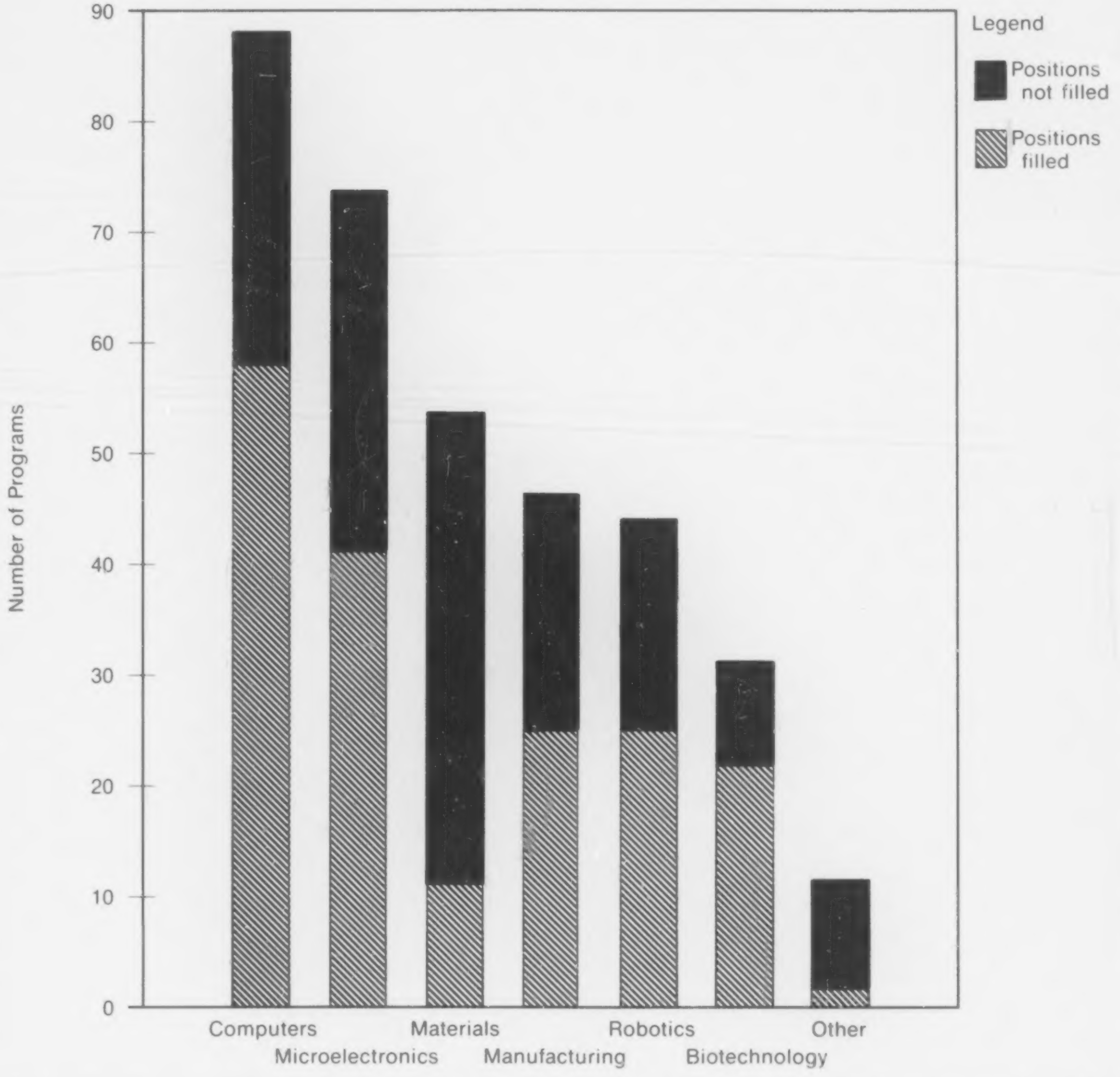


TABLE G—Faculty Recruitment During Academic Year 1983–84 in Engineering Programs in Emerging Areas

Program Area	Programs Recruiting Faculty		Faculty Recruited		Programs Unable to Fill All Positions	
	Number	Percent[1]	Number	Percent[2]	Number	Percent[3]
All programs	349	75	860	21	179	51
Biotechnology	31	53	43	11	21	66
Computers	88	92	289	26	29	32
Manufacturing	47	80	118	24	22	46
Materials	54	63	127	14	43	80
Microelectronics	73	85	178	26	32	43
Robotics	44	69	89	28	24	55
Other	11	58	17	12	9	81

[1] Based on total number of programs.

[2] As a percent of total faculty.

[3] Based on number of programs which recruited faculty during 1983–84.

TABLE H—Engineering Programs in Emerging Areas in 1983–84, with Unfilled Faculty Positions in Specialty Areas

Speciality Areas	Program Area					
	Computers	Materials	Microelectronics	Manufacturing	Robotics	Biotechnology
Artificial intelligence	×			×	×	×
Biomedical/bioelectrical engineering						×
Computer architecture	×					
Computer-assisted design	×		×	×	×	
Computer-assisted manufacturing				×	×	
Database systems	×					
Electronic materials		×	×			
Integrated circuit design		×				
Metallurgy		×				
Microprocessor instrumentation					×	
Software enginering	×					
VLSI	×		×		×	

program areas. For example, 43 percent of the computers programs and 37 percent of the manufacturing programs reported that over half of their qualified applicants did not have U.S. citizenship (see table I). Biotechnology, materials, and "other" programs reported the lowest proportion of foreign applicants.

Doctoral Students

Nearly 7,500 doctoral students were enrolled in engineering programs in emerging areas, averaging just over 16 students per program. The greatest concentration of students was in materials (32 percent), followed by computers (25 percent) and microelectronics programs (17 percent) (see table J). Programs in materials averaged 28 doctoral students, computers 20 students, and microelectronics 15 students (see table K). The smallest programs were robotics and manufacturing, averaging seven and eight doctoral students, respectively; they were also the two programs that had the most favorable faculty/student ratio, averaging nearly one faculty per doctoral student.

On average, programs in private institutions had 10 more doctoral students than programs in public institutions. The public-private difference was particularly large in biotechnology and computers. Biotechnology programs in private institutions had 20 more doctoral students than programs in public institutions. Similarly, computers programs in private institutions had 13 more students than programs in public institutions.

Emerging engineering programs located in the top 50 institutions also had larger enrollments than those located in other institutions. The average number of doctoral students in programs in the top 50 institutions by research expenditures was 22 whereas the average number of doctoral students in other programs was 10. Materials programs in such top 50 institutions had 24 more doctoral students than materials programs in other institutions.

Citizenship Status. Nearly one-half of all doctoral students were foreign citizens (see figure 5). The programs with the largest proportion of foreign students were manufacturing (59 percent) and microelectronics (52 percent); biotechnology and "other" programs had the smallest proportion.

In general, there was very little difference in the distribution of foreign students in public and private institutions: 47 percent of doctoral students in public institutions and 43 percent of those in private institutions were non-U.S. citizens (see detailed table 10). However, private biotechnology programs had fewer foreign students than public programs (29 percent versus 41 percent).

Similarly, there was very little difference in the proportion of foreign students enrolled in programs in the top 50 institutions that granted engineering degrees, but programs in the top 50 institutions by research expenditures were generally less likely to enroll foreign students than were programs in other institutions (see detailed tables 10.5 and 10.6).

About 22 percent of the respondents reported that their programs had to address significant differences in the background and experience of their U.S. and foreign students (see figure 5 and detailed table 11). The main differences cited were language, undergraduate training, and laboratory experiences. There was no apparent relationship between a program's report of these differences and the number of foreign doctoral students enrolled. Only 21 percent of the programs in manufacturing reported that they had to deal with differences in students' backgrounds even though this area had the largest proportion of foreign students. Since manufacturing programs had a high proportion of foreign faculty as well as a relatively high faculty/student ratio, one could argue that these factors led to greater interaction between faculty and students and helped compensate for differences in students' backgrounds. It is also possible that the quality of training of foreign students varies somewhat by specialty areas, presenting different problems for faculty in different program areas.

TABLE I—Percentage Distribution of Programs in Emerging Areas in Engineering, by Proportion of Non-U.S. Citizens Among Their Faculty Applicant Pool

		Proportion of Non-U.S. Citizens in Faculty Applicant Pool			
Program Area	Total	0–10%	11–50%	51–70%	71–100%
Total	100	43	28	12	16
Biotechnology	100	64	17	9	9
Computers	100	24	34	14	29
Manufacturing	100	36	27	17	20
Materials	100	53	27	10	9
Microelectronics	100	37	36	15	13
Robotics	100	50	22	8	20
Other	100	62	33	6	0

Note: Percentages may not sum to 100 because of rounding.

TABLE J—Percentage Distribution of Doctoral Students in Emerging Engineering Areas, by Program Area and by Control of Institution

Program Area	Total (N=7,496)	Public (N=4,316)	Private (N=3,180)
Total students	100	100	100
Biotechnology	9	7	13
Computers	25	24	27
Manufacturing	7	9	3
Materials	32	32	32
Microelectronics	17	17	18
Robotics	6	8	4
Other	3	4	3

Note: Percentages may not sum to 100 because of rounding.
Reference: Detailed table 10.

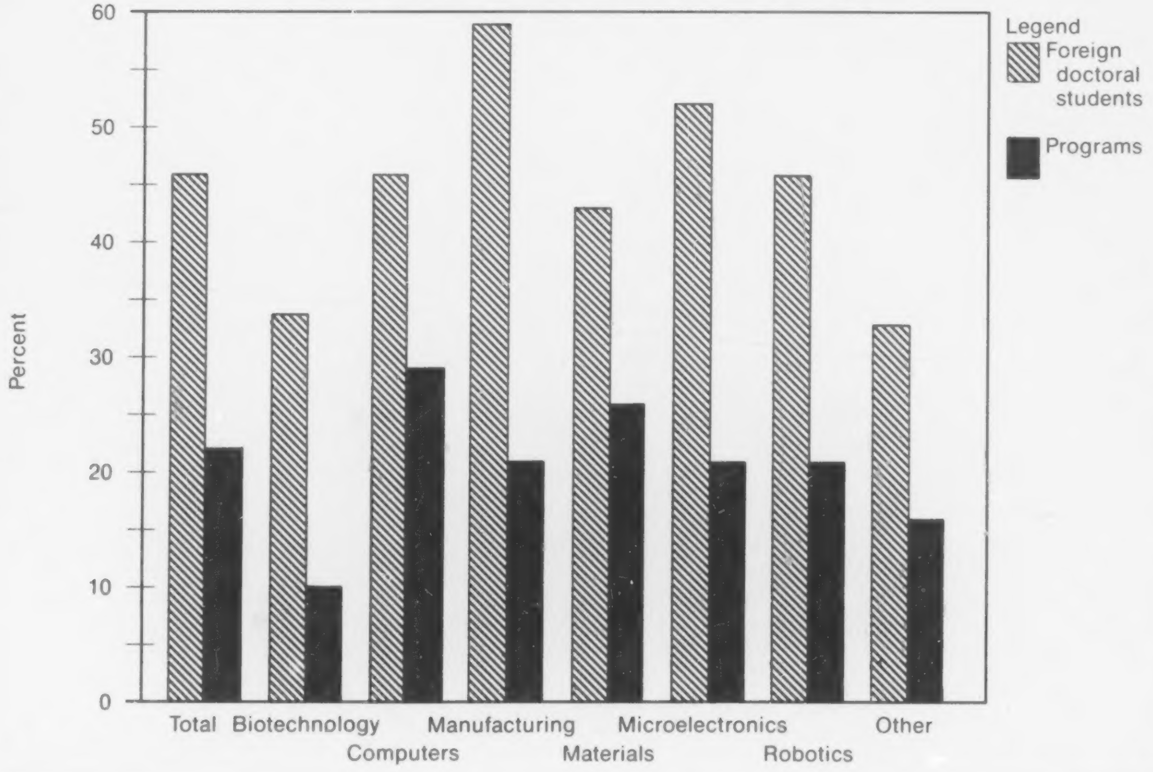
TABLE K—Average Number of Doctoral Students in Emerging Engineering Areas, by Program Area and by Control and Top 50 Status of Institution

Program Area	Total Institutions	Public	Private	Top 50 by Engineering Degrees	Other	Top 50 by Research Expenditures	Other
Total programs	16	13	23	20	12	22	10
Biotechnology	12	7	27	15	9	18	6
Computers	20	16	29	22	18	27	13
Manufacturing	8	9	8	10	7	10	6
Materials	28	25	33	39	18	40	16
Microelectronics	15	12	21	20	11	22	8
Robotics	7	7	7	10	3	10	4
Other	14	13	18	21	9	18	10

Reference: Detailed tables 2, 3, and 10

FIGURE 5

Foreign Doctoral Students and Programs Needing to Address Differences in Student Background



Institutional and Program Differences

Institutional location of the programs was related to major differences in the number of faculty and students. While public institutions had 70 percent of the engineering programs in emerging areas and 70 percent of the faculty, they accounted for only 58 percent of the doctoral students (see figure 6). In contrast, private institutions had only 30 percent of the programs and 30 percent of the faculty but 42 percent of the students. An average program in private institutions had 10 more students than a program in public institutions. Since programs in both public and private institutions had, on average, nine faculty, the faculty/student ratios were somewhat more favorable in public than in private programs.

The top 50 institutions had larger numbers of faculty as well as students. The top 50 institutions ranked highest in terms of research expenditures had 51 percent of the engineering programs in emerging areas, 64 percent of the faculty, and 70 percent of the doctoral students. On average, there were five more faculty and 12 more students in programs in such institutions than in others. Clearly, the availability of research funds allowed these programs to enroll more students and hire more faculty than was possible in programs in other institutions. Programs located in the top 50 institutions that granted engineering degrees had eight more doctoral students but only three more faculty than programs in other institutions.

There were also some interesting differences by program areas. For instance, while materials comprised 18 percent of the emerging programs in engineering, they represented 22 percent of the faculty and 32 percent of the doctoral students (see figure 7). Compared to all programs, an average program in materials had nearly two more faculty and 12 more students. Manufacturing and robotics, on the other hand, enrolled relatively fewer students and had more favorable faculty/student ratios (with nearly one faculty per student).

Figure 6
Distribution of Programs, Faculty, and Doctoral Students, by Institutional Characteristics

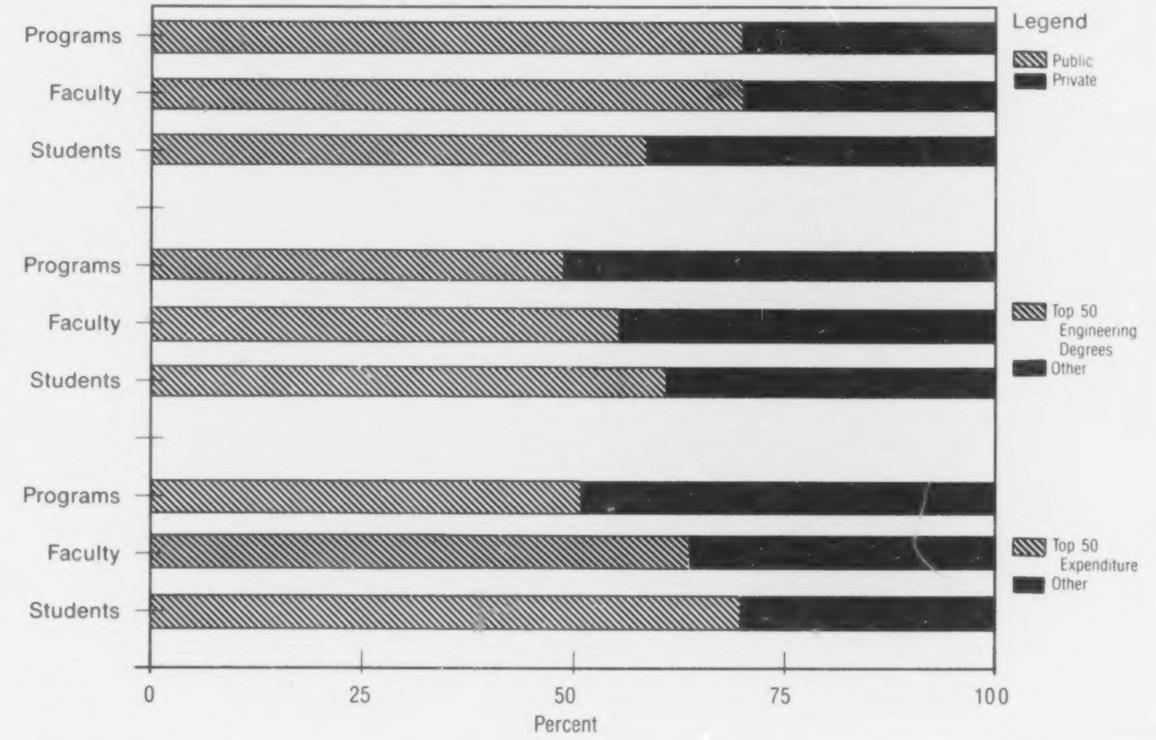
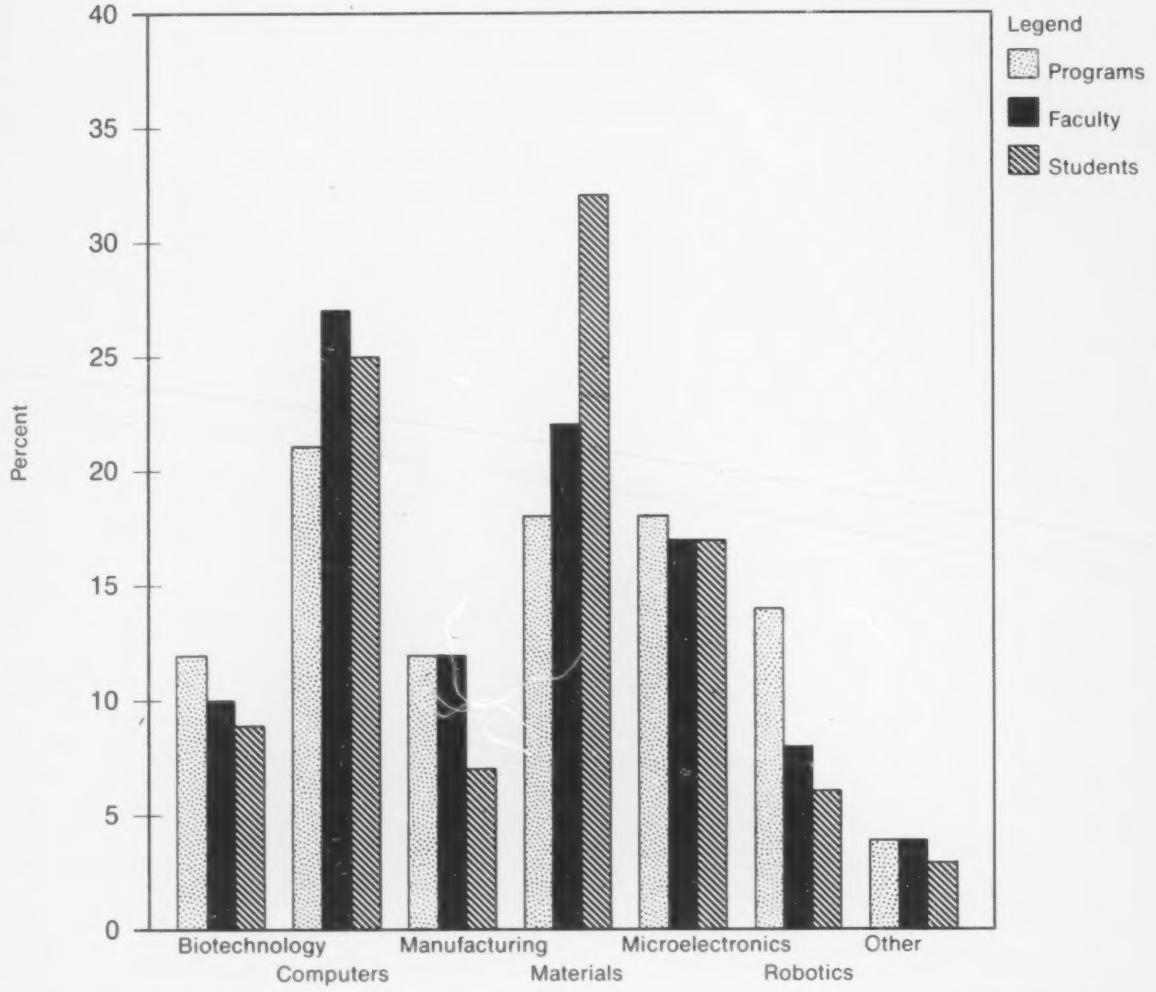


FIGURE 7
Programs, Faculty, and Doctoral Students in Emerging Areas



SUMMARY

In 1984–85, there were about 470 programs in emerging areas in engineering in 123 institutions of higher education that granted doctoral degrees in engineering. The most numerous were programs in computers; the least, programs in biotechnology.

The programs employed about 4,060 faculty, averaging nearly nine per program. Two-fifths of the faculty were full professors. The proportion of faculty with non-U.S. bachelor's degrees ranged from 13 percent (biotechnology) to 28 percent (manufacturing). There were relatively more foreigners among junior than among senior faculty.

Compared to total engineering faculty in doctoral departments, the faculty in emerging area programs were somewhat more junior in rank. On average, about 25 percent of faculty in emerging area programs were assistant professors compared to 19 percent of total engineering faculty.[1] They were also more likely to have foreign baccalaureate degrees than faculty in engineering programs in general.

The programs enrolled about 7,500 doctoral students, averaging over 16 students per program. Nearly one-half the doctoral students were non-U.S. citizens, which is somewhat larger than the proportion of foreign students in engineering programs in general. About one-fourth of the programs reported that they had to address significant differences in the background and experience of their students. The main differences cited were language, undergraduate training, and laboratory experience.

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[1] Data provided by the National Science Foundation.

Although most programs had actively recruited faculty during 1983–84, fully one-half of the respondents reported unfilled faculty positions. Shortages were particularly acute in programs in materials and biotechnology, both of which had smaller proportions of non-U.S. citizens among their faculty, faculty applicant pool, and students. In contrast, computers—which had larger proportions of foreigners among faculty, faculty applicants, and students—reported fewer shortages. According to the majority of respondents, the most important source of qualified applicants for faculty positions was the pool of new doctorates from U.S. institutions.

DETAILED STATISTICAL TABLES

TABLE 1—Top 50 Institutions on the Basis of Ph.D. Degrees Conferred in Engineering, AY 1981–82

NOTE: Only responding institutions are listed.

1. Massachusetts Institute of Technology
3. Illinois, University of (Urbana)
7. Michigan, University of (Ann Arbor)
10. Ohio State University (Main Campus)
11. Rensselaer Polytechnic Institute
12. Wisconsin, University of (Madison)
14. Texas, University of (Austin)
16. Georgia, Institute of Technology
17. Virginia Polytechnic Institute
19. Minnesota, University of (Minneapolis, St. Paul)
20. California, University of (Davis)
22. Texas A&M University (Main Campus)
24. Case Western Reserve University
25. Princeton University
26. Florida, University of
27. Iowa State University of Science & Technology
28. Columbia University
29. SUNY at Stony Brook (Main Campus)
31. Michigan State University
33. Pennsylvania, University of
34. Oklahoma, University of (Norman Campus)
35. Virginia, University of (Main Campus)
37. Washington, University of (Seattle)
38. Pittsburgh, University of (Main Campus)
39. Tennessee, University of (Knoxville)
41. Polytechnic Institute of New York
42. Washington University (St. Louis)
43. Houston, University of (Central Campus)
44. Colorado, University of (Boulder)
45. Missouri, University of (Columbia)
46. Utah, University of
47. Arizona, University of
48. Wayne State University
49. Iowa, University of

TABLE 1.1—Top 50 Institutions on the Basis of Research Expenditures,* AY 1982–83

NOTE: Only responding institutions are listed.

1. Massachusetts Institute of Technology
2. Georgia Institute of Technology
3. Stanford University
4. Illinois, University of (Urbana)
5. Texas A&M University (Main Campus)
10. Rensselaer Polytechnic Institute
11. Ohio State University (Main Campus)
12. Wisconsin, University of (Madison)
13. Michigan, University of (Ann Arbor)
15. Florida, University of
19. Texas, University of (Austin)
21. Oklahoma, University of (Norman Campus)
22. Case Western Reserve University
23. Pennsylvania, University of
24. Virginia Polytechnic Institute
25. Dayton, University of
26. Columbia University
29. Texas Tech University
31. Washington, University of (Seattle)
33. Princeton University
34. Minnesota, University of (Minneapolis, St. Paul)
35. Oklahoma State University
37. Utah, University of
38. Virginia, University of (Main Campus)
39. Maryland, University of (College Park)
40. Iowa State University of Science & Technology
41. Rutgers University (New Brunswick)
43. Washington University (St. Louis)
44. Arizona, University of
45. California, University of (Davis)
46. New Hampshire, University of
47. Polytechnic Institute of New York
48. Houston, University of (Central Campus)
50. Delaware, University of

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*These expenditures include federal and all other sources of support. Rankings are based on data provided by the ASEE Engineering College Research and Graduate Study (3/84).

TABLE 2—Operational and Planned Doctoral Engineering Programs in Emerging Areas, by Control of Institution

All Institutions

Program Area	Operational			Planned		
	Total	Public	Private	Total	Public	Private
Total programs	467	329	137	28	20	8
Biotechnology	58	42	15	6	3	3
Computers	96	66	30	5	4	1
Manufacturing	59	46	13	5	5	0
Materials	86	55	31	3	3	0
Microelectronics	86	59	27	4	2	1
Robotics	64	48	16	6	3	3
Other	19	13	5	0	0	0

TABLE 3—Operational Doctoral Engineering Programs in Emerging Areas in Top 50 Institutions, by Control of Institution

	Top 50 by Engineering Degrees			Top 50 by Research Expenditures		
Program Area	Total	Public	Private	Total	Public	Private
Total programs	224	181	43	237	180	57
Biotechnology	28	24	4	30	24	6
Computers	46	36	10	46	33	13
Manufacturing	31	24	7	33	27	6
Materials	40	33	7	43	29	14
Microelectronics	40	33	7	41	30	11
Robotics	32	25	7	36	30	6
Other	7	6	1	9	7	1

Includes only responding institutions that granted permission to list their names and programs.

TABLE 4—Institutions Offering Doctoral Programs in Emerging Engineering Areas, by Program Area

Institution	Biotechnology	Computers	Manufacturing	Materials	Microelectronics	Robotics	Other
Akron, University of (Main Campus)	x			x			
Alabama, University of (Main Campus)			x		x	x	x
Arizona State University	x	x	x		x	x	x
Arizona, University of		x	x		x	x	
Auburn University		x					
California, University of (Davis)		x		x	x	x	
California, University of (San Diego)	x	x			x		
California, University of (Santa Barbara)		x		x	x	x	
Case Western Reserve University		x		x	x		
Catholic University of America						x	
Cincinnati, University of	x	x	x	x	x	x	
Clemson University	x	x	x		x	x	
Colorado, University of (Boulder)		x					
Columbia University		x		x	x		
Dartmouth College	x			x	x		
Dayton, University of				x			
Delaware, University of	x	x		x	x	x	x
Drexel University	x	x	x	x	x	x	
Duke University	x			x	x	x	x
Florida, University of	x	x	x	x	x	x	
Georgia Institute of Technology	x	x	x	x	x	x	
Hawaii, University of (Manoa)		x			x	x	
Houston, University of (Central Campus)	x	x		x	x	x	
Howard University			x		x		
Illinois Institute of Technology	x	x		x	x	x	
Illinois, University of (Urbana)	x	x	x	x	x	x	
Iowa State University		x		x	x		x
Iowa, University of	x	x	x	x	x	x	
Johns Hopkins University		x		x	x		
Kansas State University	x	x	x	x	x	x	
Kansas, University of (Main Campus)	x		x	x		x	
Lamar University							
Louisiana State University		x	x	x			
Louisiana Tech University	x	x	x				
Maine, University of (Orono Campus)					x		
Marquette University	x			x			
Maryland, University of (College Park)	x	x	x	x	x	x	
Massachusetts Institute of Technology	x	x	x	x	x	x	
Massachusetts, University of (Amherst)		x	x	x			x
Miami, University of (Miami, FL)		x					
Michigan State University		x		x			
Michigan Technological University				x			
Michigan, University of (Ann Arbor)	x	x	x	x	x	x	
Minnesota, University of (Minneapolis, St. Paul)	x	x	x	x	x	x	
Mississippi, University of (Main Campus)		x					

Continued on next page.

TABLE 4 (continued)—Institutions Offering Doctoral Programs in Emerging Engineering Areas, by Program Area

Institution	Biotechnology	Computers	Manufacturing	Materials	Microelectronics	Robotics	Other
Missouri, University of (Columbia)	x	x		x	x		x
Montana State University	x	x		x	x	x	
Nebraska, University of (Lincoln)				x			x
Nevada, University of (Reno)		x				x	
New Hampshire, University of		x					x
New Mexico State University (Main Campus)		x			x		x
New Mexico, University of (Main Campus)		x			x		
Northeastern University		x			x	x	
Notre Dame, University of	x	x	x	x	x	x	x
Ohio State University		x	x	x	x	x	
Oklahoma State University		x	x				
Oklahoma, University of (Norman Campus)		x	x	x			
Old Dominion University							
Oregon State University		x		x	x	x	
Pennsylvania, University of	x	x	x	x	x	x	
Pittsburgh, University of (Main Campus)		x		x	x		
Polytechnic Institute of New York		x		x			x
Princeton University		x		x	x		
Rensselaer Polytechnic Institute	x	x	x	x	x	x	
Rice University		x		x			
Rochester, University of				x			
Rutgers University (New Brunswick Campus)	x	x		x	x	x	
South Carolina, University of	x	x		x		x	
Southern Methodist University	x	x	x	x	x	x	
Stanford University	x	x	x	x	x	x	
Stevens Institute of Technology		x	x	x			
SUNY at Buffalo	x	x			x		
SUNY at Stony Brook (Main Campus)		x		x	x	x	
Syracuse University					x		x
Tennessee, University of (Knoxville)				x			
Texas A & M University (Main Campus)	x	x	x	x	x	x	
Texas Tech University	x	x	x		x	x	
Texas, University of (Arlington)	x	x	x	x	x	x	
Texas, University of (Austin Campus)	x	x	x	x	x	x	x
Toledo, University of			x	x	x	x	
Tulane University		x					
Utah, University of		x		x	x	x	x
Vermont, University of				x	x		
Virginia Polytechnic Institute	x	x	x	x	x	x	x
Virginia, University of (Main Campus)	x	x	x	x	x	x	x
Washington, State University	x	x	x	x	x		
Washington University (St. Louis)	x	x		x	x		
Washington, University of (Seattle)	x	x	x	x	x	x	x
Wayne State University	x	x		x	x		
West Virginia University	x	x	x		x	x	
Wichita State University							
Wisconsin, University of (Madison)			x	x	x		
Wisconsin, University of (Milwaukee)		x	x	x	x	x	
Wyoming, University of	x	x	x	x			

TABLE 5—Engineering Faculty in Emerging Areas, by Program Area and Academic Rank, AY 1983–84

All Institutions

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Total faculty	4062	3624	1928	1687	938	851	990	909	206	177
Biotechnology	408	368	168	151	112	103	95	91	33	23
Computers	1102	1001	412	362	284	256	334	320	71	62
Manufacturing	484	381	205	155	124	100	136	113	19	12
Materials	914	830	567	504	161	147	162	154	25	25
Microelectronics	686	647	359	331	154	149	145	139	28	28
Robotics	322	271	130	110	72	66	92	70	29	25
Other	145	127	87	73	31	30	26	23	1	1

TABLE 5.1—Engineering Faculty in Emerging Areas, by Program Area and Academic Rank, AY 1983–84

Public Institutions

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Total faculty	2846	2510	1298	1118	713	639	712	642	123	111
Biotechnology	303	279	121	108	90	81	79	76	14	14
Computers	732	659	271	234	199	177	218	207	44	42
Manufacturing	388	298	162	120	101	81	108	88	16	10
Materials	604	535	366	315	114	102	116	110	8	8
Microelectronics	456	440	221	213	127	123	94	89	15	15
Robotics	265	214	103	84	59	53	77	55	26	23
Other	98	85	54	45	23	22	21	18	0	0

TABLE 5.2—Engineering Faculty in Emerging Areas, by Program Area and Academic Rank, AY 1983–84

Private Institutions

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Total faculty	1216	1114	630	569	226	212	278	267	83	66
Biotechnology	105	89	47	43	22	22	16	15	19	9
Computers	370	342	141	129	86	79	117	114	27	20
Manufacturing	97	83	43	36	23	19	28	26	3	3
Materials	310	295	201	189	47	46	46	44	17	17
Microelectronics	230	207	139	119	27	26	51	49	13	13
Robotics	57	57	27	27	12	12	15	15	3	3
Other	47	42	32	27	8	8	5	5	1	1

TABLE 5.3—Engineering Faculty in Emerging Areas, by Program Area and Academic Rank, AY 1983–84

[Top 50 Institutions, by Engineering Degrees]

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Total faculty	2281	2045	1102	982	561	511	550	488	68	64
Biotechnology	218	208	88	82	64	63	58	56	8	8
Computers	614	557	250	224	178	161	154	143	32	29
Manufacturing	254	186	90	63	72	53	83	64	8	7
Materials	601	550	376	340	117	107	101	96	7	7
Microelectronics	371	356	195	185	85	83	83	79	8	8
Robotics	163	128	65	51	33	32	60	40	4	4
Other	60	60	38	38	13	13	10	10	0	0

TABLE 5.4—Engineering Faculty in Emerging Areas, by Program Area and Academic Rank, AY 1983–84

[Top 50 Institutions, by Research Expenditures]

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Total faculty	2601	2268	1278	1086	589	532	626	559	109	92
Biotechnology	266	250	119	106	76	74	59	57	13	13
Computers	669	586	257	217	173	153	199	186	40	30
Manufacturing	296	213	127	87	70	51	84	67	14	7
Materials	630	560	396	344	106	94	112	104	17	17
Microelectronics	439	406	239	214	110	107	84	79	6	6
Robotics	212	179	84	71	39	37	70	51	19	19
Other	90	74	56	46	16	14	19	14	0	0

TABLE 6—Faculty Rank Distribution in Emerging Areas, by Program Area, AY 1983–1984

All Institutions

Program Area	Total Headcount	Total Percent	Professor	Associate Professor	Assistant Professor	Other
Total faculty	4062	100.0	47.5	23.1	24.4	5.1
Biotechnology	408	100.0	41.1	27.5	23.3	8.1
Computers	1102	100.0	37.4	25.8	30.3	6.5
Manufacturing	484	100.0	42.3	25.7	28.1	3.9
Materials	914	100.0	62.0	17.6	17.7	2.7
Microelectronics	686	100.0	52.4	22.4	21.1	4.1
Robotics	322	100.0	40.4	22.3	28.5	8.9
Other	145	100.0	59.6	21.3	18.1	1.0

TABLE 6.1—Faculty Rank Distribution in Emerging Areas, by Program Area, AY 1983–1984

Public Institutions

Program Area	Total Headcount	Total Percent	Professor	Associate Professor	Assistant Professor	Other
Total faculty	2846	100.0	45.6	25.1	25.0	4.3
Biotechnology	303	100.0	39.8	29.7	26.0	4.5
Computers	732	100.0	37.1	27.2	29.7	6.0
Manufacturing	388	100.0	41.9	26.1	27.8	4.2
Materials	604	100.0	60.6	18.8	19.3	1.3
Microelectronics	456	100.0	48.4	27.8	20.6	3.2
Robotics	265	100.0	38.9	22.4	29.0	9.7
Other	98	100.0	55.2	23.5	21.3	0.0

TABLE 6.2—Faculty Rank Distribution in Emerging Areas, by Program Area, AY 1983–1984

Private Institutions

Program Area	Total Headcount	Total Percent	Professor	Associate Professor	Assistant Professor	Other
Total faculty	1216	100.0	51.8	18.5	22.9	6.8
Biotechnology	105	100.0	45.0	21.3	15.4	18.2
Computers	370	100.0	38.1	23.1	31.5	7.3
Manufacturing	97	100.0	44.0	23.9	29.3	2.7
Materials	310	100.0	64.8	15.2	14.7	5.4
Microelectronics	230	100.0	60.3	11.8	22.0	5.8
Robotics	57	100.0	47.1	21.5	26.6	4.7
Other	47	100.0	68.7	16.8	11.3	3.0

TABLE 6.3—Faculty Rank Distribution in Emerging Areas, by Program Area, AY 1983–1984

(Top 50 Institutions, by Engineering Degrees)

Program Area	Total Headcount	Total Percent	Professor	Associate Professor	Assistant Professor	Other
Total faculty	2281	100.0	48.3	24.6	24.1	3.0
Biotechnology	218	100.0	40.1	29.3	26.7	3.8
Computers	614	100.0	40.7	29.0	25.1	5.2
Manufacturing	254	100.0	35.5	28.4	32.8	3.3
Materials	601	100.0	62.6	19.4	16.9	1.1
Microelectronics	371	100.0	52.4	22.8	22.5	2.2
Robotics	163	100.0	40.2	20.5	36.7	2.6
Other	60	100.0	62.8	20.9	16.2	0.0

TABLE 6.4—Faculty Rank Distribution in Emerging Areas, by Program Area, AY 1983–1984

(Top 50 Institutions, by Research Expenditures)

Program Area	Total Headcount	Total Percent	Professor	Associate Professor	Assistant Professor	Other
Total faculty	2601	100.0	49.1	22.6	24.1	4.2
Biotechnology	266	100.0	44.6	28.5	22.0	4.9
Computers	669	100.0	38.5	25.9	29.7	6.0
Manufacturing	296	100.0	43.0	23.7	28.5	4.8
Materials	630	100.0	62.8	16.8	17.7	2.7
Microelectronics	439	100.0	54.4	25.1	19.2	1.3
Robotics	212	100.0	39.9	18.3	33.1	8.8
Other	90	100.0	61.9	17.4	20.7	0.0

TABLE 7—Engineering Faculty in Emerging Areas Who Hold Non-U.S. Bachelor's Degrees, by Program Area and Academic Rank

All Institutions

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Faculty with non-U.S. BA's	896	831	314	289	221	198	334	318	27	26
Biotechnology	55	54	14	14	12	11	22	22	8	8
Computers	259	252	72	71	64	60	121	120	1	1
Manufacturing	134	103	43	29	31	24	57	47	3	3
Materials	176	169	82	77	43	41	47	47	5	5
Microelectronics	171	166	72	67	38	38	57	56	4	4
Robotics	84	75	27	27	26	18	25	25	6	5
Other	17	12	5	4	7	6	5	2	0	0

TABLE 7.1—Engineering Faculty in Emerging Areas Who Hold Non-U.S. Bachelor's Degrees, by Program Area and Academic Rank

Public Institutions

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Faculty with non-U.S. BA's	651	609	222	209	161	145	248	236	20	19
Biotechnology	42	42	9	9	8	8	20	20	5	5
Computers	188	186	60	59	41	40	85	85	1	1
Manufacturing	97	77	25	19	26	21	44	35	2	2
Materials	111	108	48	45	29	29	30	30	3	3
Microelectronics	127	125	53	52	27	27	43	42	4	4
Robotics	71	62	23	23	23	15	21	21	4	3
Other	14	10	3	2	6	5	5	2	0	0

TABLE 7.2—Engineering Faculty in Emerging Areas Who Hold Non-U.S. Bachelor's Degrees, by Program Area and Academic Rank

Private Institutions

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Faculty with non-U.S. BA's	245	222	92	80	61	53	86	83	7	7
Biotechnology	13	11	4	4	4	3	1	1	3	3
Computers	71	67	12	12	23	20	36	35	0	0
Manufacturing	37	26	18	10	4	3	13	12	1	1
Materials	65	62	33	32	14	12	16	16	1	1
Microelectronics	44	41	19	16	11	11	14	14	0	0
Robotics	13	13	4	4	3	3	4	4	1	1
Other	3	3	1	1	1	1	0	0	0	0

TABLE 7.3—Engineering Faculty in Emerging Areas Who Hold Non-U.S. Bachelor's Degrees, by Program Area and Academic Rank

(Top 50 Institutions, by Engineering Degrees)

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Faculty with non-U.S. BA's	503	464	181	171	138	120	179	168	6	6
Biotechnology	25	24	3	3	8	7	14	14	0	0
Computers	143	136	42	40	44	40	57	56	0	0
Manufacturing	69	53	17	14	18	13	33	25	1	1
Materials	107	104	54	51	26	26	25	25	1	1
Microelectronics	99	95	46	43	18	18	32	31	3	3
Robotics	54	47	18	18	18	11	18	18	0	0
Other	6	6	1	1	4	4	0	0	0	0

TABLE 7.4—Engineering Faculty in Emerging Areas Who Hold Non-U.S. Bachelor's Degrees, by Program Area and Academic Rank

(Top 50 Institutions, by Research Expenditures)

Program Area	Total		Professor		Associate Professor		Assistant Professor		Other	
	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE
Faculty with non-U.S. BA's	523	477	196	182	137	119	179	166	11	11
Biotechnology	31	31	10	10	6	6	11	11	4	4
Computers	147	140	46	44	39	34	63	61	0	0
Manufacturing	66	50	20	16	17	13	27	20	1	1
Materials	106	100	56	51	24	23	24	24	1	1
Microelectronics	104	100	43	40	27	27	33	31	1	1
Robotics	54	47	17	17	19	11	16	16	3	3
Other	14	9	4	3	6	4	4	1	0	0

TABLE 8—Faculty Recruitment in Progress or Completed During Academic Year 1983–84 for Engineering Programs in Emerging Areas, and Reported Difficulty in Filling Positions

All Institutions

Program Area	Programs that Recruited Faculty		Faculty Recruited		Programs Unable to Fill All Positions	
	Number	Percent	Number	Percent	Number	Percent
Total	349	100.0	860	100.0	179	51.4
Biotechnology	31	8.9	43	5.0	21	65.8
Computers	88	25.3	289	33.5	29	32.4
Manufacturing	47	13.4	118	13.7	22	46.3
Materials	54	15.5	127	14.7	43	79.8
Microelectronics	73	21.1	178	20.7	32	43.2
Robotics	44	12.6	89	10.3	24	55.4
Other	11	3.3	17	2.0	9	80.8

TABLE 8.1—Faculty Recruitment in Progress or Completed During Academic Year 1983–84 for Engineering Programs in Emerging Areas, and Reported Difficulty in Filling Positions

Public Institutions

Program Area	Programs that Recruited Faculty		Faculty Recruited		Programs Unable to Fill All Positions	
	Number	Percent	Number	Percent	Number	Percent
Total	251	100.0	664	100.0	114	45.4
Biotechnology	23	9.1	31	4.7	15	64.7
Computers	61	24.3	221	33.2	13	20.6
Manufacturing	37	14.6	95	14.3	16	42.7
Materials	37	14.7	93	14.0	29	77.6
Microelectronics	52	20.8	145	21.9	20	38.4
Robotics	34	13.6	68	10.2	17	50.2
Other	8	3.0	12	1.8	5	71.0

TABLE 8.2—Faculty Recruitment in Progress or Completed During Academic Year 1983–84 for Engineering Programs in Emerging Areas, and Reported Difficulty in Filling Positions

Private Institutions

Program Area	Programs that Recruited Faculty		Faculty Recruited		Programs Unable to Fill All Positions	
	Number	Percent	Number	Percent	Number	Percent
Total	98	100.0	197	100.0	65	66.5
Biotechnology	9	8.6	12	6.3	6	68.7
Computers	27	27.8	68	34.6	16	58.7
Manufacturing	10	10.2	23	11.7	6	59.8
Materials	17	17.6	34	17.3	15	84.6
Microelectronics	21	21.8	33	16.8	12	55.0
Robotics	10	10.0	21	10.8	7	73.4
Other	4	3.9	5	2.6	4	100.0

TABLE 8.3—Faculty Recruitment in Progress or Completed During Academic Year 1983–84 for Engineering Programs in Emerging Areas, and Reported Difficulty in Filling Positions

[Top 50 Institutions, by Engineering Degrees]

Program Area	Programs that Recruited Faculty		Faculty Recruited		Programs Unable to Fill All Positions	
	Number	Percent	Number	Percent	Number	Percent
Total	174	100.0	478	100.0	86	49.6
Biotechnology	13	7.2	15	3.2	7	55.6
Computers	42	24.0	167	34.9	14	33.3
Manufacturing	26	15.2	67	14.0	13	47.4
Materials	33	19.2	76	16.0	29	87.5
Microelectronics	33	19.2	103	21.5	10	29.2
Robotics	22	12.8	46	9.6	11	50.0
Other	4	2.4	4	0.9	3	66.7

TABLE 8.4—Faculty Recruitment in Progress or Completed During Academic Year 1983–84 for Engineering Programs in Emerging Areas, and Reported Difficulty in Filling Positions

[Top 50 Institutions, by Research Expenditures]

Program Area	Programs that Recruited Faculty		Faculty Recruited		Programs Unable to Fill All Positions	
	Number	Percent	Number	Percent	Number	Percent
Total	186	100.0	489	100.0	92	49.2
Biotechnology	20	10.8	23	4.7	13	64.3
Computers	44	23.8	169	34.5	10	22.6
Manufacturing	29	15.4	66	13.5	14	50.0
Materials	30	16.2	67	13.7	27	90.5
Microelectronics	41	22.3	124	25.4	14	34.5
Robotics	19	10.0	37	7.6	11	61.5
Other	3	1.5	3	0.6	1	50.0

TABLE 9—Most Important Sources of Qualified Applicants for Faculty Positions in Engineering Programs in Emerging Areas

All Institutions

Program Area	First-ranked Source	Second-ranked Source
Biotechnology	a	e
Computers	a	e
Manufacturing	a	e
Materials	a	e
Microelectronics	a	c
Robotics	a	e
Other	e	a

Sources of applicants listed in the questionnaire:

a. New doctorate recipients coming from U.S. institutions
b. New doctorate recipients coming from non-U.S. institutions
c. Doctorate holders coming from U.S. industry (with research and development experience)
d. Doctorate holders coming from foreign industry (with research and development experience)
e. Faculty coming from other U.S. institutions
f. Faculty coming from other departments at the same institution
g. Doctorate holders coming from U.S. postdoctoral appointments
h. Doctorate holders coming from foreign postdoctoral appointments
i. Other

TABLE 10—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

All Institutions

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	7496	4085	3411
Biotechnology	708	468	240
Computers	1907	1026	881
Manufacturing	492	199	292
Materials	2393	1356	1037
Microelectronics	1291	623	667
Robotics	447	240	207
Other	259	173	86

TABLE 10.1—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

Public Institutions

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	4316	2285	2031
Biotechnology	297	176	121
Computers	1038	530	508
Manufacturing	394	158	236
Materials	1366	770	596
Microelectronics	723	366	357
Robotics	329	175	154
Other	170	111	59

TABLE 10.2—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

Private Institutions

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	3180	1800	1380
Biotechnology	411	292	119
Computers	869	496	373
Manufacturing	98	41	57
Materials	1026	585	441
Microelectronics	568	257	311
Robotics	118	65	53
Other	90	63	27

TABLE 10.3—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

[Top 50 Institutions, by Engineering Degrees]

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	4585	2424	2161
Biotechnology	425	275	150
Computers	1032	535	497
Manufacturing	296	115	181
Materials	1549	858	690
Microelectronics	800	374	426
Robotics	336	186	150
Other	147	81	67

TABLE 10.4—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

[Other than Top 50 Institutions, by Engineering Degrees]

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	2911	1661	1250
Biotechnology	283	193	90
Computers	875	491	384
Manufacturing	196	84	112
Materials	844	497	347
Microelectronics	491	250	241
Robotics	110	54	57
Other	112	93	19

TABLE 10.5—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

[Top 50 Institutions, by Research Expenditures]

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	5263	3011	2252
Biotechnology	546	379	167
Computers	1252	749	503
Manufacturing	330	150	180
Materials	1716	966	750
Microelectronics	916	464	452
Robotics	343	209	134
Other	160	94	66

TABLE 10.6—Doctoral Students in Engineering Programs in Emerging Areas, by Citizenship Status

[Other than Top 50 Institutions, by Research Expenditures]

Program Area	Total	U.S. Citizens	Non-U.S. Citizens
Total students	2233	1074	1159
Biotechnology	162	89	73
Computers	655	277	378
Manufacturing	161	49	112
Materials	676	390	287
Microelectronics	375	159	216
Robotics	104	31	73
Other	99	79	20

Table 11—Programs in Emerging Areas that Must Address Significant Differences in Background and Experience of U.S. and Non-U.S. Doctoral Students

All Institutions

	Proportion that Must Address Differences	
Program Area	Number of Programs	Percent of All Programs
Total	103	22.0
Biotechnology	6	9.7
Computers	28	28.8
Manufacturing	13	21.2
Materials	23	26.3
Microelectronic	18	20.8
Robotics	14	21.2
Other	3	15.5

Table 11.1—Programs in Emerging Areas that Must Address Significant Differences in Background and Experience of U.S. and Non-U.S. Doctoral Students

Public Institutions

	Proportion that Must Address Differences	
Program Area	Number of Programs	Percent of All Programs
Total	84	25.6
Biotechnology	6	13.2
Computers	21	31.4
Manufacturing	11	23.7
Materials	16	28.4
Microelectronic	17	28.1
Robotics	12	25.1
Other	3	21.6

Table 11.2—Programs in Emerging Areas that Must Address Significant Differences in Background and Experience of U.S. and Non-U.S. Doctoral Students

Private Institutions

	Proportion that Must Address Differences	
Program Area	Number of Programs	Percent of All Programs
Total	18	13.4
Biotechnology	0	0.0
Computers	7	23.0
Manufacturing	2	12.4
Materials	7	22.6
Microelectronic	1	5.2
Robotics	1	9.0
Other	0	0.0

Table 11.3—Programs in Emerging Areas that Must Address Significant Differences in Background and Experience of U.S. and Non-U.S. Doctoral Students

[Top 50 Institutions, by Engineering Degrees]

	Proportion that Must Address Differences	
Program Area	Number of Programs	Percent of All Programs
Total	49	21.7
Biotechnology	4	15.0
Computers	11	24.2
Manufacturing	7	22.7
Materials	8	20.7
Microelectronic	10	24.1
Robotics	7	21.7
Other	1	20.0

Table 11.4—Programs in Emerging Areas that Must Address Significant Differences in Background and Experience of U.S. and Non-U.S. Doctoral Students

[Top 50 Institutions, by Research Expenditures]

	Proportion that Must Address Differences	
Program Area	Number of Programs	Percent of All Programs
Total	53	22.3
Biotechnology	4	14.3
Computers	13	28.1
Manufacturing	10	30.4
Materials	9	20.0
Microelectronic	10	24.1
Robotics	6	16.0
Other	1	16.7

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

June 13, 1984

Dear Higher Education Panel Representative,

Enclosed is Higher Education Panel survey number 64, "Engineering Programs in Emerging Areas." Sponsored by the National Science Foundation, its purpose is to obtain information about doctoral programs in emerging areas in colleges of engineering.

Colleges of engineering are establishing programs in a number of areas with applications in production and manufacturing, such as robotics and microelectronics. Previous studies have documented some shortages of full-time faculty in major engineering fields, but there is no information about the availability of faculty to staff the programs in the smaller emerging areas. This survey was designed to help determine the availability of engineering faculty to provide such specialized training and whether there is a sufficient number of engineering students in doctoral programs to provide an adequate future supply of new faculty for the emerging areas.

Since the requested information will likely be obtained from several people within the college of engineering, we suggest that the survey be directed to the Dean of the college of engineering. As usual, however, we leave that decision to you.

Please be assured that your institution's response will be protected to the maximum extent permissible by law. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identifiable with your institution, except where explicitly authorized by you. This survey is authorized by the National Science Foundation Act of 1950, as amended. Although you are not required to respond, your cooperation is needed to make the resu[illegible]mprehensive, reliable, and timely.

Please return all completed forms to us by **July 6, 1984.** If not all forms have been completed by that date, do not delay forwarding those that have been completed. Two prepaid envelopes have been enclosed for your convenience. If you have any problems or questions, please do not hesitate to telephone us collect at (202) 833-4757.

Sincerely,

Frank J. Atelsek

Frank J. Atelsek
Panel Director

One Dupont Circle, Washington, D.C. 20036-1193 (202) 833-4757

NATIONAL SCIENCE FOUNDATION
WASHINGTON D.C. 20550

nsf

OFFICE OF THE
ASSISTANT DIRECTOR
FOR ENGINEERING

MEMORANDUM

June 13, 1984

FOR: Deans of Engineering

FROM: Acting Assistant Director for Engineering

SUBJECT: Higher Education Panel Survey No. 64, "Engineering Programs in Emerging Areas"

I am writing to ask your cooperation and assistance in completing the attached survey on "Engineering Programs in Emerging Areas." This survey is sponsored by the National Science Foundation to obtain information about doctoral programs in emerging areas in colleges of engineering. The Foundation has asked the Higher Education Panel, a survey research program operated by the American Council on Education, to conduct this survey for us and we are sending it to 140 colleges of engineering.

As you are well aware, colleges of engineering are establishing programs in newly-identified areas such as biotechnology, robotics, microelectronics, materials and manufacturing. There have been several recent studies which have documented shortages on full-time faculty in major engineering fields such as electrical, chemical, etc. However, as of yet, no information exists as to the availability of faculty to staff programs in these new areas. This survey will help to provide this much needed data, not only as to the availability of faculty with qualifications to provide the needed specialized training, but also data on whether the number of engineering students in doctoral programs is adequate to provide a future supply of qualified faculty for these programs.

We realize that completing this questionnaire will require a substantial effort on the part of you and your staff. However, we hope you will agree that obtaining this information will be useful.

Please feel free to call the Higher Education Panel staff collect at (202) 833-4757 if there are any questions or problems in completing this survey.

Thank you for your assistance.

Carl W. Hall

Carl W. Hall
Acting Assistant Director
for Engineering

AMERICAN
COUNCIL ON
EDUCATION

OMB #3145-0009
Exp. 03/31/87

American Council on Education
Higher Education Panel Survey #64

ENGINEERING PROGRAMS IN EMERGING AREAS, 1983–84

I. Check below the emerging areas in which your college of engineering now has a doctoral program. Also indicate *other cooperating units* if there are departments outside the engineering college that work with the engineering college in these programs. In which areas have doctoral programs been authorized but are not yet in operation?

Program Area in College of Engineering (include similar titles)	**Doctoral Program in Operation**	**Other Cooperating Units**	**Doctoral Program Authorized But Not Yet in Operation**
A. Biotechnology	☐	________	☐
B. Computers	☐	________	☐
C. Manufacturing	☐	________	☐
D. Materials	☐	________	☐
E. Microelectronics	☐	________	☐
F. Robotics	☐	________	☐
G. Other (specify):			
________	☐	________	☐
________	☐	________	☐

For this survey, the term "program" is defined to be an organized instructional activity leading to the Ph.D., Sc. D., or equivalent degree. The programs of interest may be administered either separately or as areas of concentration within established departments, but they must be within the College of Engineering.

II. May we have your permission to include your institution by name in a list of universities and colleges with engineering programs in emerging areas? (None of the information requested below would be released in a manner that would identify your institution.)

____Yes ____ No

III. Do you believe that the availability of human resources is the major determining factor in the development of engineering programs in these emerging areas?

____Yes ____ No If "no," please explain.

____

____

____

IV. On the following sheets please provide the requested information for each currently operating program listed in question I above. If you have more than one program in a particular area, please provide separate information for each, using separate sheets as needed.

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984** to:

Higher Education Panel
American Council on Education
One Dupont Circle Suite 829
Washington, D.C. 20036

____
Person completing form

____
Department/telephone

(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. A. BIOTECHNOLOGY (including similar titles).

1. Area of specialization ____________________

2. Name of engineering department or unit responsible for this program ____________________

3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	FTE	Headcount	FTE
Professor	____	____	____	____
Associate professor	____	____	____	____
Assistant professor	____	____	____	____
Other ranks	____	____	____	____

> Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.
>
> Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

____ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

____ Yes ____ No

If "no", please indicate which specialties you are unable to fill:

____

____

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

____ New doctorate recipients coming from U.S. institutions
____ New doctorate recipients coming from non-U.S. institutions
____ Doctorate-holders coming from U.S. industry (with research and development experience)
____ Doctorate-holders coming from foreign industry (with research and development experience)
____ Faculty coming from other U.S. institutions
____ Faculty coming from other departments at the same institution
____ Doctorate-holders coming from U.S. postdoctoral appointments
____ Doctorate-holders coming from foreign postdoctoral appointments
____ Other (explain)____________________

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ____ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

____ U.S. citizens ____ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

____ Yes ____ No (If yes, please explain; use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984,** either to your HEP representative or to:

Higher Education Panel
American Council on Education
One Dupont Circle, Suite 829
Washington, D.C. 20036

____
Person completing form

____
Department/telephone

(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. B. COMPUTERS (including similar titles).

1. Area of specialization ____________________

2. Name of engineering department or unit responsible for this program ____________________

3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	FTE	Headcount	FTE
Professor	____	____	____	____
Associate professor	____	____	____	____
Assistant professor	____	____	____	____
Other ranks	____	____	____	____

Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.

Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

____ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

____ Yes ____ No

If "no", please indicate which specialties you are unable to fill:

____

____

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

____ New doctorate recipients coming from U.S. institutions
____ New doctorate recipients coming from non-U.S. institutions
____ Doctorate-holders coming from U.S. industry (with research and development experience)
____ Doctorate-holders coming from foreign industry (with research and development experience)
____ Faculty coming from other U.S. institutions
____ Faculty coming from other departments at the same institution
____ Doctorate-holders coming from U.S. postdoctoral appointments
____ Doctorate-holders coming from foreign postdoctoral appointments
____ Other (explain) ____________________

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ____ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

____ U.S. citizens ____ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

____ Yes ____ No (If yes, please explain; use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984**, either to your HEP representative or to:

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American Council on Education
One Dupont Circle, Suite 829
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Person completing form

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Department/telephone

(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. C. MANUFACTURING (including similar titles).

1. Area of specialization ______

2. Name of engineering department or unit responsible for this program ______

3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	FTE	Headcount	FTE
Professor	______	______	______	______
Associate professor	______	______	______	______
Assistant professor	______	______	______	______
Other ranks	______	______	______	______

Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.

Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

______ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

______ Yes ______ No

If "no", please indicate which specialties you are unable to fill:

______

______

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

______ New doctorate recipients coming from U.S. institutions
______ New doctorate recipients coming from non-U.S. institutions
______ Doctorate-holders coming from U.S. industry (with research and development experience)
______ Doctorate-holders coming from foreign industry (with research and development experience)
______ Faculty coming from other U.S. institutions
______ Faculty coming from other departments at the same institution
______ Doctorate-holders coming from U.S. postdoctoral appointments
______ Doctorate-holders coming from foreign postdoctoral appointments
______ Other (explain) ______

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ______ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

______ U.S. citizens ______ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

______ Yes ______ No (If yes, please explain; use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984**, either to your HEP representative or to:

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(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. D. MATERIALS (including similar titles).

1. Area of specialization ______________________________

2. Name of engineering department or unit responsible for this program ______________________________

3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	FTE	Headcount	FTE
Professor	____	____	____	____
Associate professor	____	____	____	____
Assistant professor	____	____	____	____
Other ranks	____	____	____	____

Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.

Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

____ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

____ Yes ____ No

If "no", please indicate which specialties you are unable to fill:

____

____

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

____ New doctorate recipients coming from U.S. institutions
____ New doctorate recipients coming from non-U.S. institutions
____ Doctorate-holders coming from U.S. industry (with research and development experience)
____ Doctorate-holders coming from foreign industry (with research and development experience)
____ Faculty coming from other U.S. institutions
____ Faculty coming from other departments at the same institution
____ Doctorate-holders coming from U.S. postdoctoral appointments
____ Doctorate-holders coming from foreign postdoctoral appointments
____ Other (explain) ______________________________

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ____ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

____ U.S. citizens ____ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

____ Yes ____ No (If yes, please explain; use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984**, either to your HEP representative or to:

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____
Person completing form

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Department telephone

(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. E. MICROELECTRONICS (including similar titles).

1. Area of specialization ____________

2. Name of engineering department or unit responsible for this program ____________

3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	**FTE**	**Headcount**	**FTE**
Professor	____	____	____	____
Associate professor	____	____	____	____
Assistant professor	____	____	____	____
Other ranks	____	____	____	____

> Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.
>
> Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

____ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

____ Yes ____ No

If "no", please indicate which specialties you are unable to fill:

____

____

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

____ New doctorate recipients coming from U.S. institutions
____ New doctorate recipients coming from non-U.S. institutions
____ Doctorate-holders coming from U.S. industry (with research and development experience)
____ Doctorate-holders coming from foreign industry (with research and development experience)
____ Faculty coming from other U.S. institutions
____ Faculty coming from other departments at the same institution
____ Doctorate-holders coming from U.S. postdoctoral appointments
____ Doctorate-holders coming from foreign postdoctoral appointments
____ Other (explain) ____________

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ____ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

____ U.S. citizens ____ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

____ Yes ____ No (If yes, please explain, use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984**, either to your HEP representative or to:

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American Council on Education
One Dupont Circle, Suite 829
Washington, D.C. 20036

____
Person completing form

____
Department telephone

(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. F. ROBOTICS (including similar titles).

1. Area of specialization ____________________
2. Name of engineering department or unit responsible for this program ____________________
3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	FTE	Headcount	FTE
Professor	____	____	____	____
Associate professor	____	____	____	____
Assistant professor	____	____	____	____
Other ranks	____	____	____	____

Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.

Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

____ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

____ Yes ____ No

If "no", please indicate which specialties you are unable to fill:

____

____

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

____ New doctorate recipients coming from U.S. institutions
____ New doctorate recipients coming from non-U.S. institutions
____ Doctorate-holders coming from U.S. industry (with research and development experience)
____ Doctorate-holders coming from foreign industry (with research and development experience)
____ Faculty coming from other U.S. institutions
____ Faculty coming from other departments at the same institution
____ Doctorate-holders coming from U.S. postdoctoral appointments
____ Doctorate-holders coming from foreign postdoctoral appointments
____ Other (explain) ____________________

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ____ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

____ U.S. citizens ____ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

____ Yes ____ No (If yes, please explain; use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984**, either to your HEP representative or to:

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One Dupont Circle, Suite 829
Washington, D.C. 20036

____
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____
Department telephone

(DESCRIBE PROGRAMS WITHIN THE COLLEGE OF ENGINEERING ONLY.)

IV. G. OTHER

1. Area of specialization ____________________

2. Name of engineering department or unit responsible for this program ____________________

3. Number of faculty—headcount and full-time-equivalent in AY 1983–84—in this program, by academic rank. Of these, how many did not receive their bachelor's degree in the U.S.?

	Total		Non-U.S. Bachelor's Degree	
	Headcount	FTE	Headcount	FTE
Professor	____	____	____	____
Associate professor	____	____	____	____
Assistant professor	____	____	____	____
Other ranks	____	____	____	____

Include only regular faculty with full-time appointments at your institution. Please provide both the total headcount of faculty, irrespective of their level of involvement in the program, as well as the full-time-equivalent in the program.

Faculty not part of the College of Engineering may be included if they have a major involvement in the program and function in a manner similar to the faculty of the College of Engineering.

4a. How many faculty recruitments were in progress or completed during AY 1983–84 for this program, irrespective of the proposed year of employment? (Include all regular faculty recruited as full-time for the institution even if only part-time for this program.)

____ (If none, enter "0" and skip to item 6 below.)

b. Were you able, or do you expect to be able, to fill all these positions?

____ Yes ____ No

If "no", please indicate which specialties you are unable to fill:

____

____

5a. What were the two most important sources of qualified applicants for faculty positions? Rank in order using "1" for the most important source, "2" for the second most important source.

____ New doctorate recipients coming from U.S. institutions
____ New doctorate recipients coming from non-U.S. institutions
____ Doctorate-holders coming from U.S. industry (with research and development experience)
____ Doctorate-holders coming from foreign industry (with research and development experience)
____ Faculty coming from other U.S. institutions
____ Faculty coming from other departments at the same institution
____ Doctorate-holders coming from U.S. postdoctoral appointments
____ Doctorate-holders coming from foreign postdoctoral appointments
____ Other (explain) ____________________

b. Approximately what proportion of the qualified applicant pool did not have U.S. citizenship? ____ %

6. Headcount of doctoral students in the program in AY 1983–84, by citizenship:

____ U.S. citizens ____ non-U.S. citizens

7. Are there significant differences in the background and experience of the U.S. and non-U.S. doctoral students that must be addressed as part of the program?

____ Yes ____ No (If yes, please explain; use back of page if necessary.)

Thank you for your cooperation. Please keep a copy of this form for your records. Please return all completed forms by **July 6, 1984**, either to your HEP representative or to:

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APPENDIX B: METHODS SUMMARY

The Higher Education Panel forms the basis of an ongoing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct specialized surveys on topics of current policy interest to the higher education community and to government agencies.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities, divided into two half-samples of 520 institutions each. Institutions were drawn from the more than 3,200 colleges and universities listed in the National Center for Education Statistics' *Education Directory, Colleges and Universities*. All institutions in the population are grouped according to the Panel's stratification design, which is based primarily upon institution type (doctorate-granting, comprehensive, baccalaureate, specialized, two-year academic or occupational), control (public, private), and size (full-time-equivalent enrollment). For any given survey, either the entire Panel or an appropriate subgroup is used.

The survey operation is dependent upon a network of campus representatives who, through their presidents, have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus officials for response.

The survey instrument (see Appendix A) was mailed on June 13, 1984, to 135 Panel institutions which, during 1981–82, awarded at least one doctorate degree in engineering. Only seven institutions in the eligible population of 142 were not in the Panel and, consequently, were not sent the survey instrument.

In the first section of the instrument, engineering deans were asked to provide summary information about the number and kind of emerging program areas in which their engineering college offers, or plans to offer, a doctoral program. In the second section, individual program heads were asked detailed questions about number and rank of faculty, recruitments and sources of applicants for faculty positions, and the number and citizenship status of doctoral students in the program for each emerging area.

After mail and telephone follow-ups were completed, substantive data were received from 96 institutions, for a response rate of 78 percent. (Of the originally defined survey population of 142, 19 institutions reported no activity in any of the emerging areas under study, reducing the population to 123). Data from the 96 responding Panel institutions were statistically adjusted to represent the national population of 123 colleges and universities that award engineering doctorate degrees and offer doctoral programs in emerging areas.

The technical notes (Appendix C) contain a description of the weighting methodology and a comparison of respondents and nonrespondents.

APPENDIX C: TECHNICAL NOTES

The survey population for this study was defined as the doctorate-granting colleges of engineering that offered doctoral programs in the emerging areas. There were, in total, 142 schools awarding Ph.D.'s in engineering. Of these, 135 were Panel members and seven were not. Of the 135 Panel members, eighteen schools did not have programs in the emerging areas. Of the 117 remaining Panel institutions, 96 responded to the survey. The seven institutions which were not Panel members were contacted by phone: one did not have any programs in emerging areas; six did. These six institutions as well as 21 Panel institutions which did not respond to the survey were treated as non-respondents. Thus, substantive data were received from 78 percent of the institutions in the total population of 123.

Non-Response Adjustment Procedure

The Higher Education Panel's (HEP) stratification design divides institutions by size (full-time equivalent enrollment), control (public, private), and type (doctoral-granting, comprehensive, baccalaureate, specialized, two-year academic or occupational). For purposes of non-response adjustment, within the HEP stratification design by type and control of institutions, post-stratification by number of engineering doctorates was used within two of the original HEP strata; all other engineering doctorate-granting institutions were simply grouped by control as shown in table C-1 below. The post-stratification grouping was judged to produce a more accurate non-response adjustment procedure because institutions within groups, by number of engineering degrees awarded, are likely to be more homogeneous than when treated as an overall class.

The survey responses were weighted using the non-response adjustment weights (as shown in table C-1) to calculate estimates for all doctorate-granting colleges of engineering that offered doctoral programs in emerging areas. No estimates of sampling error were computed because the entire population of institutions was involved, given the manner of adjustment for non-response; the procedure implied that no sampling process was involved.

TABLE C-1: Post-stratification Groupings

Cell	Type of Institution	Population	Respondent	Non-response Adjustment Factor
	HEP—public doctorate-granting:			
01	Granting 40 or more engineering doctorates	9	5	1.800
02	Granting 10–39 engineering doctorates	36	33	1.091
03	Granting 1–9 engineering doctorates	22	18	1.222
	HEP—private doctorate-granting:			
04	Granting 25 or more engineering doctorates	12	7	1.583
05	Granting 10–24 engineering doctorates	10	7	1.429
06	Granting 1–9 engineering doctorates	11	9	1.222
07	HEP—All other public	16	12	1.333
08	HEP—All other private	7	5	1.400
	Totals	123	96	

Comparison of Respondents and Nonrespondents

Table C-2 compares survey respondents and nonrespondents and presents the non-response rates on the basis of several variables. Higher than average response rates were recorded for public institutions and those in the South. Institutions in the East and West had lower than average response rates.

TABLE C-2: Response Rates and Selected Characteristics of Respondents and Nonrespondents

(In percentages)

Institutional Characteristic	Respondents	Nonrespondents	Response Rate
Total	100.0	100.0	78.0
Control			
Public	70.8	55.6	81.9
Private	29.2	44.4	70.0
Region			
East	21.9	37.0	67.7
South	33.3	18.5	86.5
Midwest	26.0	22.2	80.6
West	18.8	22.2	75.0
Top 50 based on Ph.D degrees conferred	37.5	37.0	78.3
Top 50 based on research expenditures	36.5	51.9	71.4

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The Higher Education Panel is a survey research program established by the Council for the purpose of securing policy-related information quickly from representative samples of colleges and universities. *Higher Education Panel Reports* are designed to expedite communication of the Panel's survey findings to policy-makers in government, in the associations, and in educational institutions across the nation.

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1.23

Recent Changes in Teacher Education Programs

Engin Inel Holmstrom

Higher Education Panel Reports
Number 67 November 1985

American Council on Education
Washington, D.C. 20036

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HIGHLIGHTS

Admission and Graduation Requirements

- The time of admission to the teacher education program occurs after the freshman year.
- At the time of admission, seven in 10 institutions have minimum GPA requirements in university-wide general studies courses. The GPA average is 2.3 for students entering an elementary education program and 2.4 for students entering a secondary education program.
- Four in 10 institutions have separate minimum GPA requirements in English courses taken as part of university-wide general studies programs.
- In addition to the admission requirements of the college or university and successful completion of the general studies program, nearly half the teacher education programs require students to pass a standardized or proficiency test. Since 1980 the number of programs requiring standardized or proficiency tests for entry has more than doubled.
- Over three in 10 programs also require that entering students pass a speech and hearing test. In addition, nearly half rely on recommendations and one in 10 require a personal interview.
- The average number of credit hours required for a baccalaureate degree for teacher candidates is 127.
- The average number of credit hours in education courses required for graduation is about 43 for elementary teacher candidates, and 30 for secondary teacher candidates.
- Included within the teacher education program are theory and methods courses that amount to 20 hours for elementary teacher candidates, and nine hours for secondary teacher candidates.
- An average of ten hours of a teaching practicum is required by most programs.
- Nine in 10 programs require teacher candidates to spend time in schools prior to graduation. The average student will spend about 85 (secondary education program) to 113 (elementary education program) clock hours in such experiences.
- Most teacher education programs require students to take courses in mathematics, science, and communications. Half the programs require teacher candidates to take courses in computer science.
- One-fourth of secondary education programs have raised their GPA requirements for prospective teachers during the past five years, and one in 10 have increased requirements in their subject matter majors.
- The number of programs with exit testing has increased. Since 1980, two in five programs have instituted exit testing.

Recruitment

- Only one in four colleges or universities provide scholarships specifically for teacher candidates with high academic ability.
- Scholarships for teacher candidates are more readily available in public than in private programs.
- Only four percent of the institutions have loan forgiveness programs designed for teacher candidates.
- Recruitment procedures vary, with the programs trying different methods to attract students.

BACKGROUND

The National Commission on Excellence and other organizations have raised the nation's awareness of the need for quality teacher education. There have been numerous reports discussing the need to attract and retain high quality teachers, to improve teacher preparation programs, to raise standards by which teacher candidates are measured, to increase the supply of qualified teachers in shortage areas, and to improve the working conditions for teachers. There is currently very little reliable information, however, on how schools, colleges, and departments of education (SCDEs) have responded to these criticisms and recommendations, and what changes, if any, have been implemented in teacher education programs across the nation.

A survey undertaken by the American Council on Education in June 1984 indicated that nearly nine in 10 institutions with teacher education programs had minimum requirements and about eight in 10 had instituted higher admission standards. In addition, another one in 10 were considering improvements in their admission standards.[1]

This survey was sponsored by the Department of Education to gather more in depth information on three areas relating to teacher education. The first is entry requirements: What are the minimum standards at the nation's SCDEs that teacher candidates must now meet to enter teacher preparation programs, and what changes occurred in these standards since 1980–81? The second area concerns changes in course requirements: Are there increases or decreases in course requirements, and if so, in what areas? The third is recruitment: What measures are institutions now using to attract students, and especially high-ability students, into teacher education programs?

METHODS SUMMARY

The Higher Education Panel was created in 1971 by the American Council on Education for the purpose of conducting limited-scale surveys on topics of current policy interest to the higher education community and to government agencies. The current Panel is a disproportionate stratified sample of 1,040 colleges and universities, divided into two half-samples of 520 institutions each. Institutions were drawn from the more than 3,200 colleges and universities listed in the National Center for Education Statistics' *Education Directory, Colleges and Universities*. All institutions included in the population are grouped according to the Panel's stratification design, which utilizes two sampling domains (certainty and probability domains) and is based upon institutional type (doctorate-granting, comprehensive, baccalaureate, specialized, and two-year academic or occupational), control (public, private) and size (full-time equivalent undergraduate enrollment, full-time equivalent graduate enrollment, and educational and general expenditures). For any given survey, either the entire Panel, a half-sample, or an appropriate subgroup is used. The field operation is dependent on a network of campus representatives who, through their presidents, have agreed to participate. The representatives receive the Panel's questionnaires and direct them to the most appropriate campus official for response.

This survey consisted of all Panel institutions (both split-halfs) that reported the award of at least one baccalaureate in education in 1980–81. Two-year colleges and specialized institutions were excluded. Out of 1,040 Panel institutions, 489 met the survey criteria. Questionnaires were mailed to 489 institutions in December 1984. After a mail follow-up in February and a phone follow-up in March, usable data were received from 399 or 82 percent of the institutions. (A copy of the survey questionnaire is presented in Appendix A).

Data from responding institutions were statistically adjusted (weighted) to represent 1,068 institutions of higher education that grant baccalaureate degrees in education. Institutional weights were computed separately for each stratum, based on the ratio of the number of respondents to the number of institutions in the population. (See Appendix B for technical notes describing the weighting methodology and comparison of respondents and nonrespondents.)

---

[1] Elaine El-Khawas. *Campus Trends, 1984*. Higher Education Panel Reports Number 65, February 1985. Washington, D.C.: American Council on Education.

FINDINGS

The survey instrument had three sections: the first section requested information on the specific minimum requirements for admittance into the undergraduate teacher preparation programs. The second section requested information on changes in credit hour requirements for teacher education programs that have taken place over the last five academic years. The last section sought information on teacher recruitment efforts.

The data provided here represent national estimates for 1,068 institutions of higher education that have a SCDE and award at least one baccalaureate in education. About two-fifths of the programs were in public and three-fifths in private institutions. Over one-half were located in baccalaureate colleges, 34 percent in comprehensive universities, and 12 percent in doctoral institutions (see table A). It should be pointed out, however, that although there are more teacher education programs in private institutions, public programs tend to be larger and produce more of the bachelor's degrees in education. For instance, in 1980–81, 78 percent of the bachelor's degrees earned in education were conferred by public programs and only 22 percent by private programs.[2]

TABLE A—Distribution of SCDEs by Control and Type of Institution—1984–85

	Total		Public		Private	
	No.	%	No.	%	No.	%
Total	1,068	100	434	100	634	100
Doctoral Univ.	129	12	95	22	34	5
Comprehensive Univ.	363	34	243	56	120	19
Baccalaureate Colleges	576	54	96	22	480	76

Entry Requirements

Only one-fifth of the institutions with SCDEs accepted freshmen into their undergraduate teacher education programs (see table B). SCDEs in private institutions were somewhat more likely to accept freshmen into their programs than were those in public institutions (25 percent versus 15 percent). The difference was particularly striking in doctoral and comprehensive universities: 35 percent of the programs in private but only 13 percent of those in public doctoral universities accepted freshmen; in comprehensive universities, the comparable figures were 33 percent and 17 percent, respectively.

GPA Requirements in General Studies. In 1984–85, 68 percent of the SCDEs had minimum grade point average (GPA) requirements in general studies for students entering elementary and secondary education programs (see figures 1 and 2). Such requirements were more frequent among the programs in public than in private institutions (for instance, 76 percent of public but 61 percent of private SCDEs had minimum GPA requirements for entry into secondary education programs).

During the past five years, the proportion of SCDEs with minimum GPA requirements had remained relatively stable in private institutions, while increasing slightly in public institutions. In public institutions, most of the changes had occurred in doctoral universities and baccalaureate colleges.

TABLE B—Institutions That Admit Freshmen to Teacher Education Programs, by Control and Type of Institution—1984–85

Control and type of institution	Number of Institutions	Percentage of all Institutions with Programs
All Institutions	223	21
Public Institutions	66	15
Doctoral	12	13
Comprehensive	41	17
Baccalaureate	13	14
Private Institutions	157	25
Doctoral	12	35
Comprehensive	40	33
Baccalaureate	105	22

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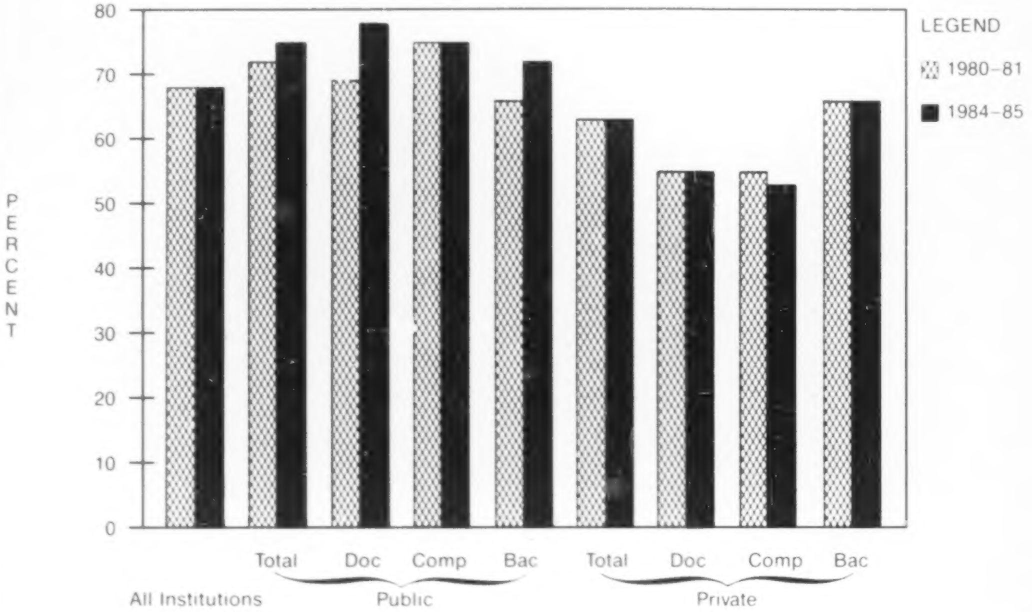
[2] National Center for Education Statistics. *The Condition of Education, 1983*. Washington, D.C.: Government Printing Office, 1983. p.192.

FIGURE 1

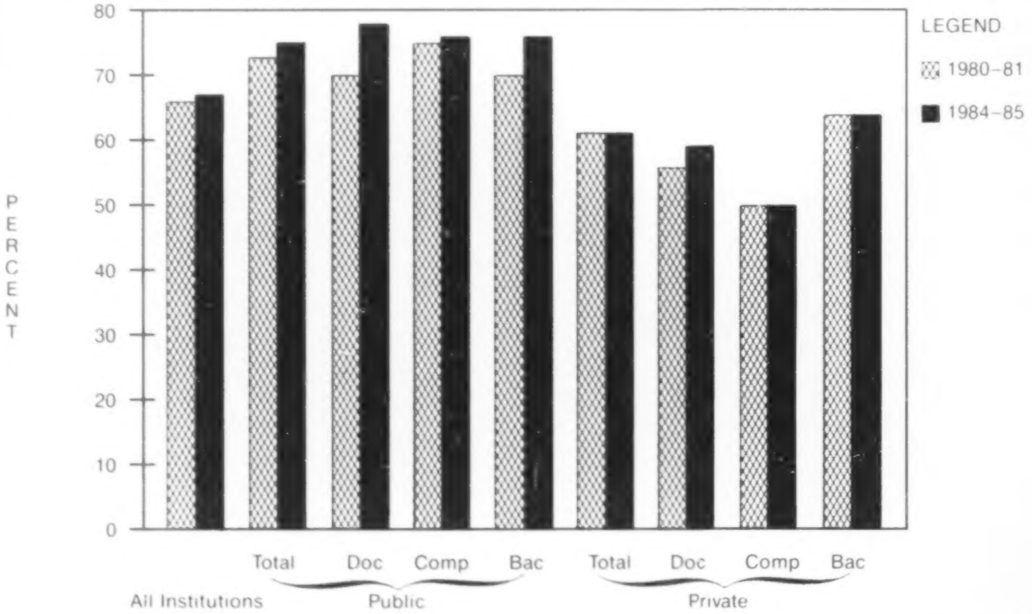
Minimum GPA Requirements for Entry into Elementary Education Programs, by Control and Type of Institution
1980–81 and 1984–85



Reference: Detailed table I.2a

FIGURE 2

Minimum GPA Requirements for Entry into Secondary Education Programs, by Control and Type of Institution
1980–81 and 1984–85



Reference: Detailed table I.2a

For instance, in 1980–81, 69 percent of the SCDEs in doctoral institutions had minimum GPA requirements for entry into elementary education programs; in 1984–85, 78 percent of the programs had such requirements. The change in the baccalaureate colleges was from 66 percent in 1980–81 to 72 percent in 1984–85. Similar increases in doctoral universities and baccalaureate colleges were noted for entry into secondary education programs.

The average minimum GPA requirement for students entering elementary education programs in 1984–85 was 2.3 on a scale of 1 to 4, up slightly from 2.2 in 1980–81; the average minimum GPA requirement for students entering secondary education programs was 2.3, up slightly from 2.2 in 1980–81 (see detailed table I.2a). Since 1980–81, the proportion of the programs with minimum GPA requirements of 3.0 or more remained constant at about one percent for students entering elementary education programs and two percent for students entering secondary education programs. The proportion requiring at least 2.5–2.9 GPAs, on the other hand, had increased from under 30 percent to over 40 percent in 1984–85 (see figures 3 and 4).

These averages tend to conceal some of the differences in public and private programs as well as changes that had taken place in a number of SCDEs during the last five years, however. First, while fewer private than public SCDEs have minimum GPA requirements for entry into teacher preparation programs, more private programs than public ones require GPAs of 2.5 or more. In 1984–85, 51 percent of private but 36 percent of public programs required minimum GPAs of 2.5 or more for entry into elementary education programs (see detailed table I.2b). The comparable figures for entry into secondary education programs were 53 percent and 38 percent, respectively (see detailed table I.2c).

Second, during the last five years, more public than private programs had increased their minimum GPA requirements to 2.5–2.9 so that the difference in public and private programs had been somewhat narrowed. In 1984–85, about one-half of the SCDEs in private institutions and between 30 to 40 percent of those in public institutions required minimum GPAs of 2.5–2.9 for entry into their programs. In contrast, five years earlier, only half as many public as private programs required minimum GPAs of 2.5–2.9 for entry into their programs. Finally, most of the increases in the public programs had occurred in doctoral universities; in elementary education programs, the proportion requiring minimum GPAs of 2.5–2.9 had increased from 21 percent in 1980–81 to 45 percent in 1984–85, and in secondary education programs, from 25 percent to 59 percent.

Minimum Grade Requirements in English. About four in 10 of all SCDEs had minimum grade requirements for completing general studies English courses for their students entering elementary and secondary education programs (see detailed table I.3a). With the exception of some minor increases in public programs, these requirements had changed little over the past five years. In 1984–85, fully one-half of SCDEs in public institutions but only about 30 percent of those in private institutions had minimum grade requirements in English for entering students. In both public and private programs, the average grade requirements in English were about 2.1 for students entering teacher education programs. Fewer than 10 percent required entering students to have grade averages of 2.5 or more in English, and the proportion of such programs remained the same since 1980–81 (see detailed tables I 3b, 3c).

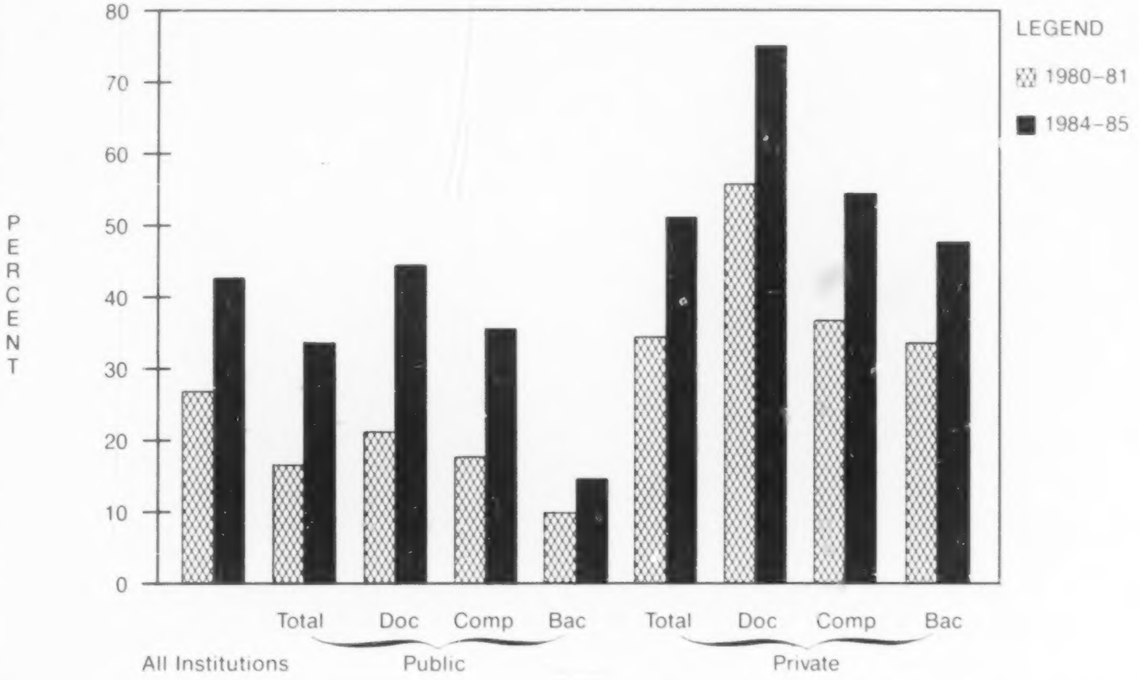
Entry Tests. In addition to the above admission requirements, in 1984–85, nearly one-half of all SCDEs required that a student must pass a standardized or proficiency test in order to qualify for admittance into elementary and secondary education programs (see figures 5 and 6). However, there was no uniformly administered test. Among more frequently given tests were ACT, SAT, CAT, PPST, NTE and a score of other state-mandated or state-developed competency tests.

The proportion of the SCDEs requiring standardized or proficiency tests for entry into teacher education programs had more than doubled over the last five years, particularly in public institutions. In 1984–85, over half the public programs and over 40 percent of the private ones had entry tests. The largest increases in the number of programs adopting entry tests had occurred in public comprehensive universities where the proportion requiring standardized or proficiency tests for entry into elementary education programs had increased from 26 percent in 1980–81 to 61 percent in 1984–85, and for entry into secondary education programs, from 24 percent to 60 percent. The least likely programs to use entry tests were those located in public baccalaureate colleges and private comprehensive universities.

Other Entry Requirements. There were other requirements and procedures used to screen students for admission into teacher education programs. For instance, over 35 percent required that their students pass a speech and hearing test; about 10 percent relied on personal interviews, while between 40 to 50 percent relied on recommendations (see detailed table I.5a). In general, private institutions were more likely than public to rely on recommendations, while public institutions were more likely than private to require speech and hearing tests. Baccalaureate colleges

FIGURE 3

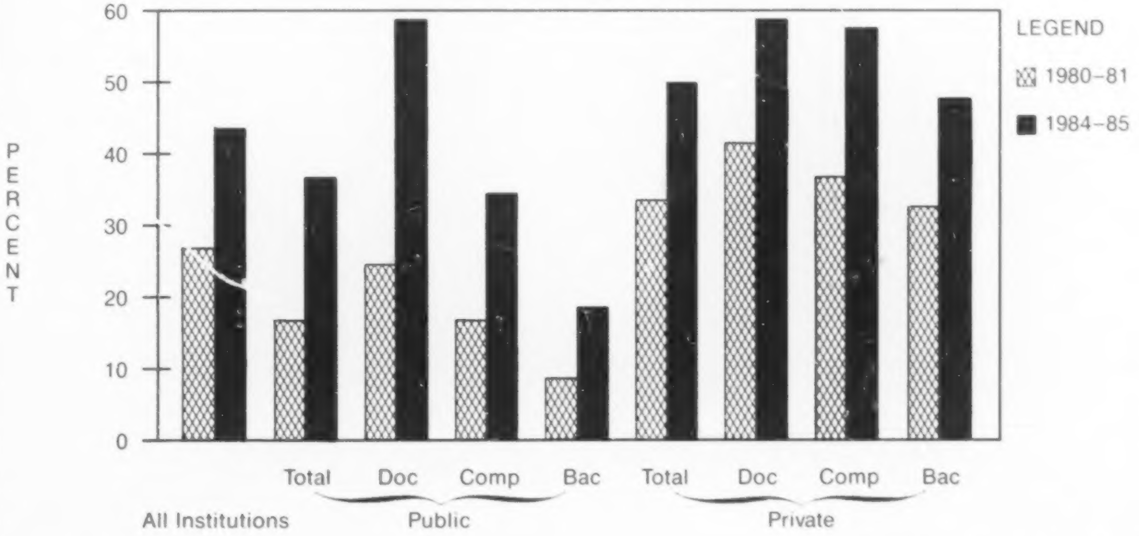
Elementary Education Programs With Minimum 2.5–2.9 GPA Requirements, by Control and Type of Institution 1980–81 and 1984–85



Reference: Detailed table I.2b

FIGURE 4

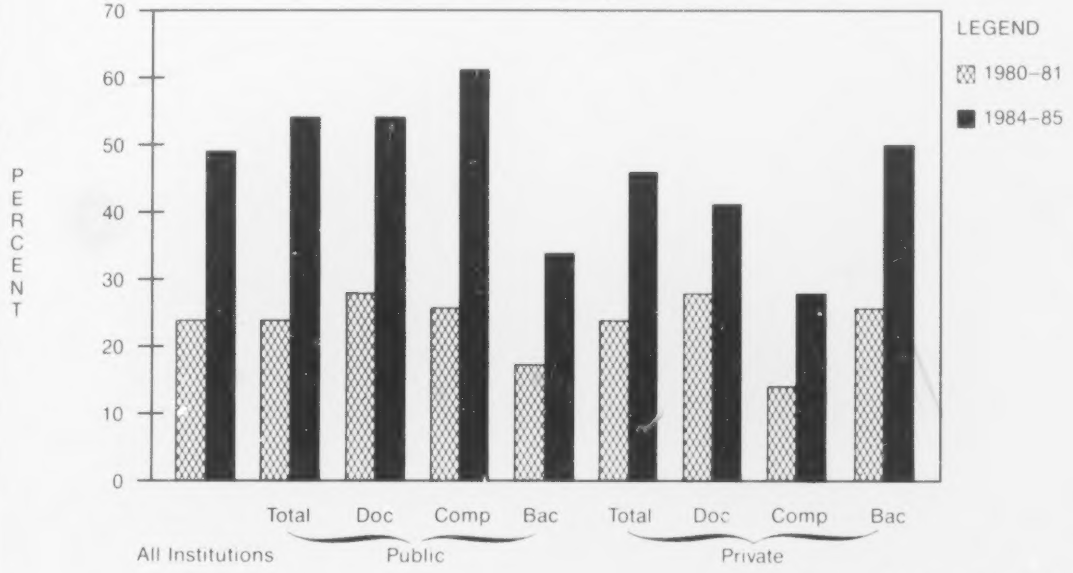
Secondary Education Programs With Minimum 2.5–2.9 GPA Requirements, by Control and Type of Institution 1980–81 and 1984–85



Reference: Detailed table I.2c

FIGURE 5

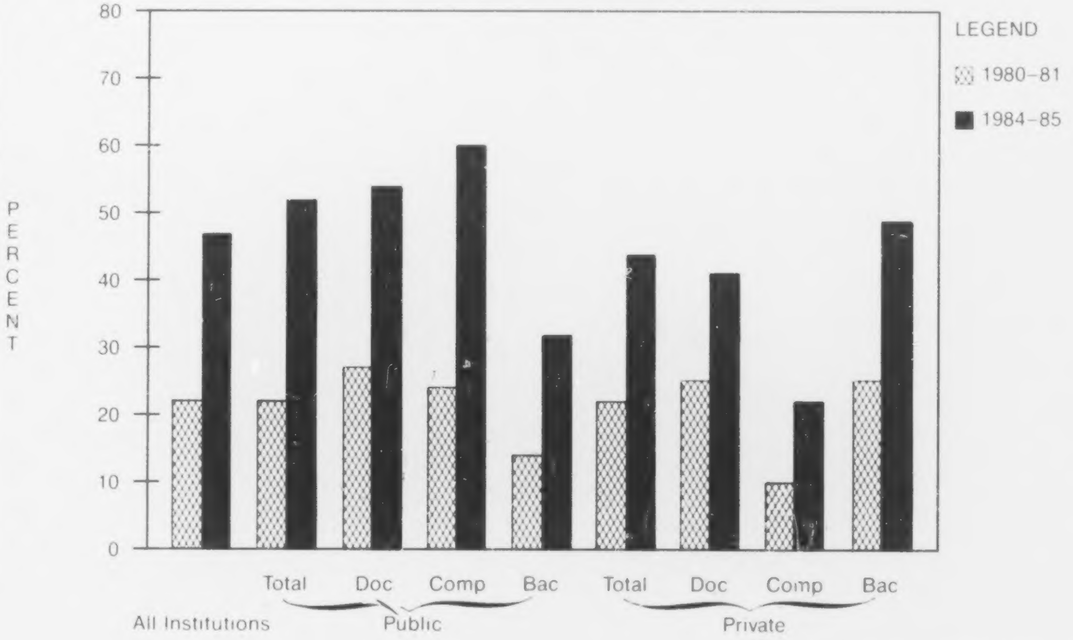
SCDEs Requiring Entry Tests Into Elementary Education Programs, by Control and Type of Institution 1980–81 and 1984–85



Reference: Detailed table I.4a

FIGURE 6

SCDEs Requiring Entry Tests Into Secondary Education Programs, by Control and Type of Institution 1980–81 and 1984–85



Reference: Detailed table I.4a

seemed to rely on recommendations more heavily than others, while comprehensive universities used speech and hearing tests more frequently than did others. The most apparent change seems to have occurred in the speech/hearing testing area, with just over 10 percent introducing such tests as a part of their admission-screening procedure.

Changes In Course Requirements

The average number of credit hours required for a baccalaureate degree in teacher education programs was 127.4 in 1984–85 (see table C). There was very little difference in credit hour averages across institutions, and practically no change since 1980–81.

Credit Hour Requirements in Education Courses. In an average elementary education program, about one-third of the credit hours required for a baccalaureate was in education courses. The proportion of credit hours required in education courses in secondary education programs was somewhat lower (23 percent). On average, 43.4 credit hours were required in all education courses for graduation from elementary education programs; in contrast, only 29.7 average number of credit hours were required for graduation from secondary education programs (see detailed table II.1a1).

In elementary education programs, the proportion of SCDEs requiring 46 or more credit hours in education courses had increased from 36 percent in 1980–81 to 42 percent in 1984–85. In secondary education programs, the proportion with similar requirements had remained stable at about 5 percent (see detailed tables II.1a2 and 1a3). Elementary education programs in private institutions were slightly more likely than were those in public institutions to have increased their requirements for all education courses to 46 or more credit hours. The largest increases had occurred in SCDEs in baccalaureate colleges where the proportion requiring 46 or more credit hours for students entering elementary education programs increased from 36 percent in 1980–81 to 46 percent in 1984–85.

Credit Hours in Student Teaching Practicum. Nearly all SCDEs required credit hours in teaching practicum prior to graduation (see detailed table II.1b). On the average, 10.3 credit hours were required in elementary education programs and 9.9 in secondary education programs. Overall these requirements had changed very little during the period from 1980 to 1985. There were some minor exceptions: for instance, private doctoral institutions had increased their student teaching practicum requirements by an hour in elementary education programs.

Credit Hours in Principles and Methods of Teaching. Students were required to take courses in principles and methods of teaching in nearly all of the SCDEs before graduation (see detailed table II.1c). On average, 19.9 credit hours in such courses were required for graduation from elementary education programs, and 9.1 from secondary education programs. Overall these requirements seemed to have remained relatively stable over the past five years.

Field Experience. Over 90 percent of the SCDEs required their students to have early field experiences (see detailed table II.1d). On the average, 112.9 clock hours of field experience were required for graduation from elementary education programs, and 84.5 from

TABLE C—Average Number of Credit Hours Required for a Baccalaureate Degree in Teacher Education Programs, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	Average Number of Credit Hours		Percent Change 80/81–84/85
	1980–81	1984–85	
All Institutions	126.5	127.4	0.7
Public Institutions	126.7	127.7	0.8
Doctoral	125.1	125.5	0.3
Comprehensive	125.8	126.9	0.9
Baccalaureate	129.0	129.9	0.7
Private Institutions	126.4	127.2	0.6
Doctoral	124.9	125.4	0.4
Comprehensive	125.2	125.9	0.5
Baccalaureate	127.0	127.9	0.7

secondary education programs. Generally, SCDEs in doctoral universities required more clock hours for student field experience than did SCDEs in other institutions. Among SCDEs in private institutions, those in comprehensive universities required more clock hours in early field experience than did SCDEs in other private institutions.

Other Subject Area Requirements. The proportion of the SCDEs requiring credit hours in subject areas outside education varied somewhat, depending on specific subject areas. Most SCDEs required their students to take courses in mathematics, science, and communications (see Figure 7). Nearly one-half also required courses in computer science. About 20 percent required courses in arts and humanities and in social and behavioral science, while about 10 percent required courses in health, safety, and physical education and in "other" areas. Most SCDEs had not changed their requirements in such subject areas since 1980–81. An exception to this observation concerns the area of computer sciences. More than half the 500 institutions now requiring courses in it indicated that they had changed the requirement in the past five years (see detailed tables II.2b and 2c).

The average credit hour requirements in non-education subject areas ranged from a high of 10.1 hours in communications in 1984–85 to a low of 2.9 in computer science for students graduating from elementary education programs. With the exception of health, safety, and physical education, credit hour requirements for most non-education subject areas were even smaller in 1980–81.

Exit Testing. Since 1980–81, about 20 percent of the SCDEs have instituted exit testing in teacher education programs (see table D). Public programs were more likely than were private programs to have exit testing requirements (about 23 percent versus 14 percent). Further, SCDEs in comprehensive universities were slightly more likely than others to require that their students pass some kind of test before graduation. There was not much uniformity in the type of exit tests administered by the programs. Some used standardized content-area tests or basic skills tests; others used teacher assessment tests—mostly NTE but also tests that are mandated or prepared by states.

Credit Hour Requirement Changes in Secondary Education Teacher Programs. A majority of institutions reported no changes during the past five years for credit-hour requirements for subject majors outside education for students in secondary education programs (see detailed table II.4). About 10 percent reported a change, involving, on the average, a three-hour increase in credit hour requirements from 28.7 in 1980–81 to 31.7 in 1984–85. SCDEs in public institutions, and particularly those in comprehensive universities, reported larger increases in credit hour requirements for subject majors outside education than did other programs. In private institutions, SCDEs in comprehensive and doctoral universities reported increases while those in baccalaureate colleges reported decreases.

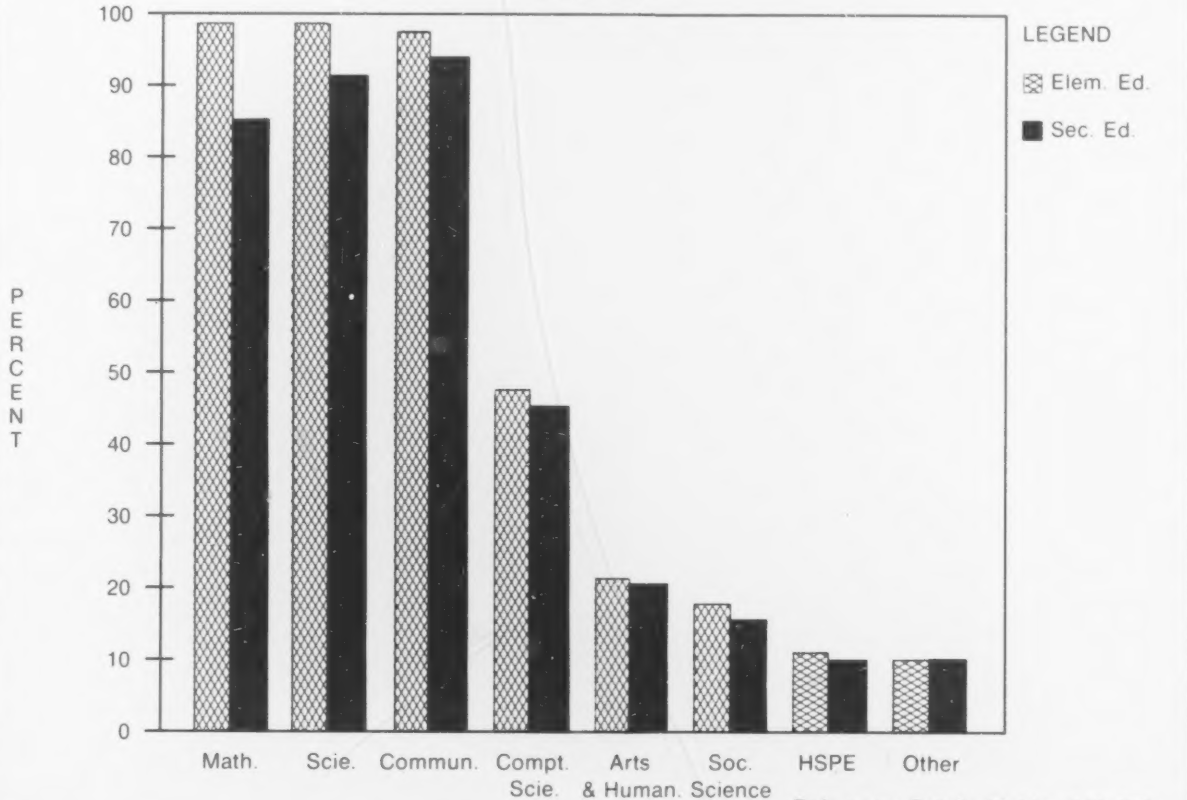
Most institutions reported that they had not changed their minimum GPA requirements for the subject majors outside education during the last five years (see detailed table II.5). Only 25 percent of the SCDEs reported that they had increased their GPA requirements. The largest increases had occurred in public baccalaureate colleges where, on average, GPA requirements increased from 1.6 in 1980–81 to 2.2 in 1984–85, and in private comprehensive universities where GPA requirements increased from 2.0 to 2.5.

TABLE D—Number and Percent of Institutions That Have Instituted "Exit Testing" in Teacher Education Programs Since 1980–81, by Control and Type of Institution

Control and Type of Institution	Elementary Education Programs		Secondary Education Programs	
	No.	%*	No.	%*
All Institutions	189	17.7	198	18.5
Public Institutions	102	23.5	99	22.8
Doctoral	20	21.1	18	18.9
Comprehensive	60	24.7	59	24.3
Baccalaureate	22	22.9	22	22.9
Private Institutions	87	13.7	99	15.6
Doctoral	4	11.8	3	8.8
Comprehensive	25	20.8	30	25.0
Baccalaureate	58	12.1	66	13.8

*Institutions with the requirement, as a percentage of all institutions with teacher education programs.

FIGURE 7
SCDEs That Require Selected Subject Areas Outside Education
1984–85



Reference: Detailed tables II.2b & 2c

Teacher Recruitment Efforts

Various methods were used to attract students to teacher preparation programs.

Scholarships. In general, SCDEs tend to provide incentive scholarships for students of high academic ability rather than for students of high ability in specific areas. Nearly one-fourth of the institutions provided scholarships for students of high academic ability (see figure 8). This practice was more prevalent among public (45 percent) than among private (10 percent) institutions. It was also a practice more frequent in doctoral than in other institutions.

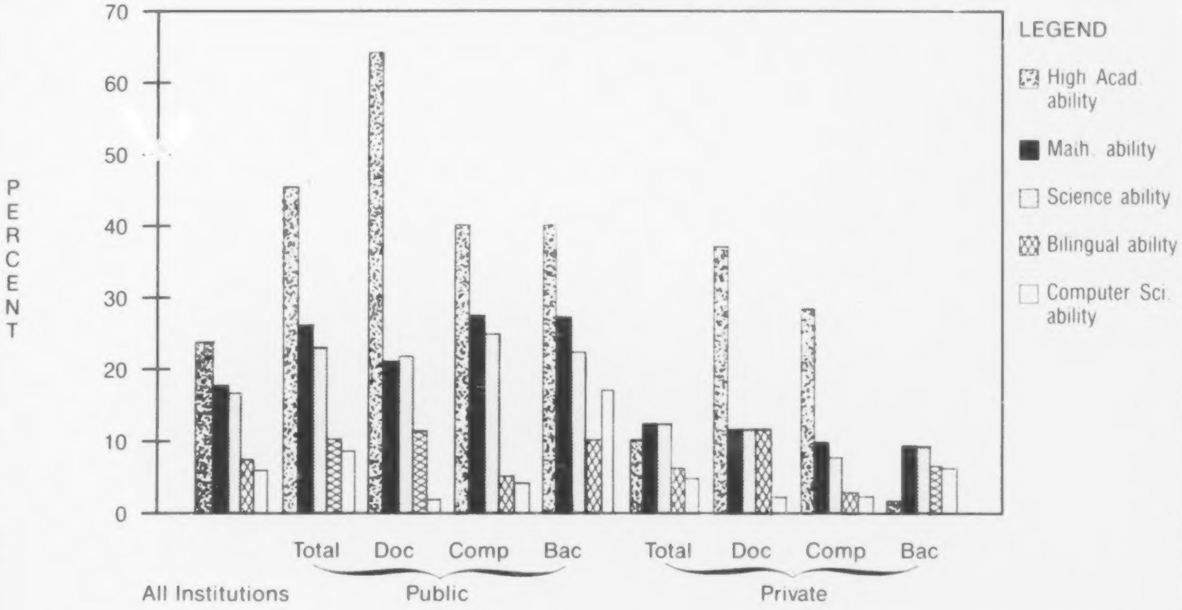
Nearly twenty percent of the institutions also provided scholarships for students of high ability in mathematics and in science, while nearly 10 percent provided scholarships in bilingual education/ESL. In general, more public than private institutions provided scholarships. Scholarships for students with high ability in mathematics and science were more readily available in public comprehensive universities and baccalaureate colleges than in doctoral universities. In contrast, scholarships for students with language aptitude were most available in doctoral institutions.

Loan Forgiveness. Four percent of institutions offered loan forgiveness for teacher candidates if they engaged in classroom teaching, and about 10 percent offered loan forgiveness to teacher candidates majoring in specific fields (see detailed table III.2).

Recruitment Efforts. During the last five years, SCDEs seemed to have tried various recruitment methods, including personal contacts (18 percent), visits to high schools by college representatives (15 percent), inviting students to visit college (15 percent), mailings (11 percent), and college fair exhibits (8 percent) (see detailed table III.3). Some programs were also considering various other recruitment efforts, ranging from loans and scholarships (10 percent) to media contacts (2 percent) (see detailed table III.4)

FIGURE 8

SCDEs That Provide Incentive Scholarships to High Ability Students, by Control and Type of Institution 1984–85



Reference: Detailed table III.1

SUMMARY

The survey provided information on entry and graduation requirements and recruitment procedures of the nation's teacher education programs and any changes that had taken place during the period from 1980 to 1985. Although teacher education programs are housed in a variety of higher education institutions, ranging from large public doctoral universities to small private baccalaureate colleges, they appear to have relatively uniform admission and graduation standards. This uniformity possibly reflects the involvement of state agencies in setting program guidelines and determining criteria for teacher candidate certification.

A majority of the nation's SCDEs do not accept freshmen into their programs. Most have minimum GPA requirements in general studies for entering students. The average GPA requirement is nearly constant in all institutions: 2.3 for entry into elementary education programs and 2.4 for entry into secondary education programs.

The average number of credit hours required for a baccalaureate degree in education is about 127 hours and relatively constant across all institutions. On average, 43 credit hours are required in all education courses to graduate from elementary education programs, and about 30 hours to graduate from secondary education programs. Education courses constitute about one-third of all credit hours required for graduation from elementary education programs and just over one-fifth of those from secondary education programs.

Virtually all programs require their students to have teaching practica before graduation. They also require their students to take courses in principles and methods of teaching. On average, about 20 hours in such coursework are required for graduation from elementary education programs and about 9 hours from secondary education programs. Finally, most programs require early field experience of about 113 clock hours.

This is, however, where program similarities end. Only about two-fifths of the SCDEs have minimum grade requirements for completing general studies in English courses as part of their admission procedure. About one-half administer standardized or proficiency tests to screen students for admission, but there appears to be no uniformity in the type of tests administered, although some are given more frequently than others. Since 1980, one-fifth of the programs have instituted exit testing, but again there is wide variation in tests administered, possibly reflecting differences in state-mandated tests.

Recruitment methods vary, with no standardized procedures to recruit well-qualified students to teacher education programs.

Only one-fourth of the programs offer scholarships to high-ability students, and very few programs provide scholarships as a means of enticing teacher candidates to shortage areas.

Since 1980, there has been some effort to tighten admission requirements to teacher education programs, particularly in public programs which enroll and graduate most of the students. (These changes may be due to new state requirements for teachers in areas such as drug abuse education, economics education, and reading). Finally, public programs are more likely than private to have minimum grade requirements in English courses for entering students. They are more likely to require entry and exit testing, have speech and hearing tests, and provide scholarships for students of high academic ability.

This report describes changes that have taken place during 1980–85 and the current status of teacher education programs pertaining to admission/graduation requirements and recruitment efforts. Although beyond the scope of this study, the full implications of findings presented here would require comparisons with similar data for other professions education programs in the nation's colleges and universities.

DETAILED STATISTICAL TABLES

I.2a Institutions That Have a Minimum GPA Requirement for Entry into Teacher Education Programs, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	1980 Institutions w/ Requirement No.	 %*	 Ave. Min. GPA	1984–85 Institutions w/ Requirement No.	 %*	 Ave. Min. GPA	Percentage Change 1980/1-84/5 Insts.	 GPA
				Elementary Education Programs				
All Institutions	676	66.7	2.2	702	68.0	2.3	3.8	4.5
Public Institutions	303	71.6	2.2	317	74.8	2.3	4.6	4.5
Doctoral	61	68.5	2.3	69	77.5	2.4	13.1	4.3
Comprehensive	181	75.1	2.1	181	75.1	2.3	0.0	9.5
Baccalaureate	61	65.6	2.1	67	72.0	2.1	9.8	0.0
Private Institutions	373	63.1	2.3	385	63.3	2.3	3.2	0.0
Doctoral	16	55.2	2.4	16	55.2	2.5	0.0	4.2
Comprehensive	59	54.6	2.2	59	53.2	2.3	0.0	4.5
Baccalaureate	298	55.6	2.3	310	66.2	2.3	4.0	0.0
				Secondary Education Programs				
All Institutions	688	65.9	2.2	698	67.2	2.3	1.5	4.5
Public Institutions	312	72.6	2.1	327	76.2	2.3	4.8	9.5
Doctoral	66	70.2	2.3	74	77.9	2.4	12.1	4.3
Comprehensive	182	74.9	2.1	183	75.6	2.3	0.5	9.5
Baccalaureate	64	69.6	2.1	70	76.1	2.2	9.4	4.8
Private Institutions	376	61.2	2.3	371	60.8	2.4	−1.3	4.3
Doctoral	18	56.3	2.3	19	59.4	2.4	5.6	4.3
Comprehensive	59	50.4	2.2	57	50.0	2.3	−3.4	4.5
Baccalaureate	298	64.1	2.3	295	63.6	2.4	−1.0	4.3

*Institutions with the requirement as a percentage of all institutions with teacher education programs.

I.2b Minimum GPA Requirements for Entry into Elementary Education Programs, by Control and Type of Institution—1980/81 and 1984/85

Control and Type of Institution	Institutions w/ NO Requirement	Institutions Requiring Minimum GPA of— Less Than 2.0	 2.0–2.4	 2.5–2.9	 3.0 or More
			1980–81		
All Institutions	392	11	479	182	4
Public Institutions	131	11	237	51	4
Doctoral	34	1	44	13	3
Comprehensive	61	7	142	32	1
Baccalaureate	36	3	51	6	0
Private Institutions	261	0	242	131	0
Doctoral	18	0	7	9	0
Comprehensive	61	0	37	22	0
Baccalaureate	182	0	198	100	0
			1984–85		
All Institutions	365	11	384	302	6
Public Institutions	117	11	193	107	6
Doctoral	26	1	32	31	5
Comprehensive	62	7	107	66	1
Baccalaureate	29	3	54	10	0
Private Institutions	248	0	191	195	0
Doctoral	18	0	4	12	0
Comprehensive	60	0	27	33	0
Baccalaureate	170	0	160	150	0

I.2c Minimum GPA Requirements for Entry into Secondary Education Programs, by Control and Type of Institution—1980/81 and 1984/85

Control and Type of Institution	Institutions w/ NO Requirement	Institutions Requiring Minimum GPA of—			
		Less Than 2.0	2.0–2.4	2.5–2.9	3.0 or More
			1980–81		
All Institutions	381	11	480	184	12
Public Institutions	124	11	241	54	4
Doctoral	30	1	45	16	3
Comprehensive	61	7	142	32	1
Baccalaureate	33	3	54	6	0
Private Institutions	257	0	239	130	8
Doctoral	15	0	11	8	0
Comprehensive	61	0	37	22	0
Baccalaureate	181	0	191	100	8
			1984–85		
All Institutions	370	11	366	308	13
Public Institutions	107	11	190	121	5
Doctoral	21	1	25	44	4
Comprehensive	60	7	111	64	1
Baccalaureate	26	3	54	13	0
Private Institutions	263	0	176	187	8
Doctoral	15	0	8	11	0
Comprehensive	63	0	24	33	0
Baccalaureate	185	0	144	143	8

I.3a Institutions That Have a Minimum Grade Requirement in English for Entry into Teacher Education Programs, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	1980–81			1984–85		
	Institutions w/Requirement		Ave. Minimum Grade	Institutions w/Requirement		Ave. Minimum Grade
	No.	%*		No.	%*	
			Elementary Education Programs			
All Institutions	374	36.9	2.1	414	40.1	2.1
Public Institutions	200	47.3	2.0	218	51.4	2.0
Doctoral	29	32.6	1.9	33	37.1	2.0
Comprehensive	113	46.9	2.0	121	50.0	2.0
Baccalaureate	58	62.4	1.9	64	68.8	2.1
Private Institutions	174	29.4	2.1	196	32.2	2.1
Doctoral	8	27.6	2.3	8	27.6	2.3
Comprehensive	34	31.5	2.1	37	33.3	2.2
Baccalaureate	132	29.1	2.1	151	32.3	2.1
			Secondary Education Programs			
All Institutions	378	36.2	2.0	417	40.1	2.1
Public Institutions	207	48.1	2.0	227	52.9	2.1
Doctoral	29	30.9	1.9	34	35.8	2.0
Comprehensive	117	48.0	2.0	126	52.1	2.0
Baccalaureate	61	66.3	2.0	67	72.8	2.1
Private Institutions	171	27.9	2.1	190	31.1	2.1
Doctoral	8	25.0	2.1	8	25.0	2.1
Comprehensive	31	26.5	2.0	31	27.2	2.2
Baccalaureate	132	28.4	2.1	151	32.5	2.1

*Institutions with the requirement, as a percentage of all institutions with teacher education programs.

I.3b Distribution of Minimum Grade in English Required for Entry into Elementary Education Programs, by Control and Type of Institution—1980/81 and 1984/85

Control and Type of Institution	All Institutions w/ Requirement	Institutions Requiring Minimum Grades in English of—			
		Less Than 2.0	2.0–2.4	2.5–2.9	3.0 or More
	1980–81				
All Institutions	374	24	319	7	24
Public Institutions	200	10	184	1	5
Doctoral	29	6	20	1	2
Comprehensive	113	1	109	0	3
Baccalaureate	58	3	55	0	0
Private Institutions	174	14	135	6	19
Doctoral	8	0	6	1	1
Comprehensive	34	6	20	5	3
Baccalaureate	132	8	109	0	15
	1984–85				
All Institutions	414	16	362	7	29
Public Institutions	218	5	202	1	10
Doctoral	33	4	26	1	2
Comprehensive	121	1	115	0	5
Baccalaureate	64	0	61	0	3
Private Institutions	196	11	160	6	19
Doctoral	8	0	6	1	1
Comprehensive	37	3	26	5	3
Baccalaureate	151	8	128	0	15

I.3c Distribution of Minimum Grade in English Required for Entry into Secondary Education Programs, by Control and Type of Institution—1980/81 and 1984/85

Control and Type of Institution	All Institutions w/ Requirement	Institutions Requiring Minimum Grades in English of—			
		Less Than 2.0	2.0–2.4	2.5–2.9	3.0 or More
	1980–81				
All Institutions	378	26	325	4	23
Public Institutions	207	12	189	1	5
Doctoral	29	6	20	1	2
Comprehensive	117	3	111	0	3
Baccalaureate	61	3	58	0	0
Private Institutions	171	14	136	3	18
Doctoral	8	0	7	1	0
Comprehensive	31	6	20	2	3
Baccalaureate	132	8	109	0	15
	1984–85				
All Institutions	417	13	372	4	28
Public Institutions	227	5	211	1	10
Doctoral	34	4	27	1	2
Comprehensive	126	1	120	0	5
Baccalaureate	67	0	64	0	3
Private Institutions	190	8	161	3	18
Doctoral	8	0	7	1	0
Comprehensive	31	0	26	2	3
Baccalaureate	151	8	128	0	15

I.4a Institutions That Require Standardized Tests for Entry into Teacher Education Programs, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	1980–81		1984–85		Percentage Change 1980/1-84/5
	No.	%*	No.	%*	
			Elementary Education Programs		
All Institutions	242	23.8	506	49.0	109.1
Public Institutions	103	24.3	227	53.5	120.4
Doctoral	25	28.0	48	53.9	92.0
Comprehensive	62	25.7	147	60.7	137.1
Baccalaureate	16	17.2	32	34.4	100.0
Private Institutions	139	23.5	279	45.8	100.7
Doctoral	8	27.5	12	41.3	50.0
Comprehensive	15	13.8	31	27.9	106.7
Baccalaureate	116	25.5	236	50.4	103.4
			Secondary Education Programs		
All Institutions	232	22.2	490	47.1	111.2
Public Institutions	96	22.3	224	52.2	133.3
Doctoral	25	26.6	51	53.6	104.0
Comprehensive	58	23.8	144	59.5	148.3
Baccalaureate	13	14.1	29	31.5	123.1
Private Institutions	136	22.1	266	43.6	95.6
Doctoral	8	25.0	13	40.6	62.5
Comprehensive	12	10.3	25	21.9	108.3
Baccalaureate	116	24.9	228	49.1	96.6

*Institutions with the requirement, as a percentage of all institutions with teacher education programs.

I.5a Other Entry Requirements for Teacher Education Programs, by Control and Type of Institution—1984–85

Control and Type of Institution	Institutions That Require							
	Interviews		Recommendations		Speech/Hearing Testing		Other	
	No.	%*	No.	%*	No.	%*	No.	%*
				Elementary Education Programs				
All Institutions	112	10.9	498	48.3	396	38.4	364	35.3
Public Institutions	46	10.8	147	34.7	202	47.6	161	38.0
Doctoral	8	9.0	22	24.7	34	38.2	30	33.7
Comprehensive	35	14.5	84	34.7	126	52.1	96	39.7
Baccalaureate	3	3.2	41	44.1	42	45.2	35	37.6
Private Institutions	66	10.9	351	57.7	194	31.9	203	33.4
Doctoral	2	6.9	5	17.2	5	17.2	6	20.7
Comprehensive	14	12.6	55	49.5	42	37.8	34	30.6
Baccalaureate	50	10.7	291	62.2	147	31.4	163	34.8
				Secondary Education Programs				
All Institutions	114	11.0	446	42.9	368	35.4	336	32.3
Public Institutions	45	10.5	139	32.4	184	42.9	156	36.4
Doctoral	7	7.4	20	21.1	27	28.4	27	28.4
Comprehensive	35	14.5	84	34.7	122	50.4	97	40.1
Baccalaureate	3	3.3	35	38.0	35	38.0	32	34.8
Private Institutions	69	11.3	307	50.3	184	30.2	180	29.5
Doctoral	4	12.5	8	25.0	6	18.8	8	25.0
Comprehensive	11	9.6	47	41.2	31	27.2	32	28.1
Baccalaureate	54	11.6	252	54.3	147	31.7	140	30.2

*Institutions with the requirement, as a percentage of all institutions with teacher education programs.

Note: Multiple responses were permitted; therefore, percentages may exceed 100.

I.5b Recent Changes in Other Entry Requirements, by Control and Type of Institution—1980–81 to 1984–85

Control and Type of Institution	Institutions That, in the last 5 Years, Have Changed Requirements in—							
	Interviews		Recommendations		Speech/Hearing Testing		Other	
	No.	%*	No.	%*	No.	%*	No.	%*
	Elementary Education Programs							
All Institutions	53	5.2	74	7.3	133	13.1	154	15.2
Public Institutions	22	5.2	27	6.4	71	16.8	68	16.1
Doctoral	2	2.2	5	5.6	13	14.6	15	16.9
Comprehensive	17	7.1	16	6.6	39	16.2	37	15.4
Baccalaureate	3	3.2	6	6.5	19	20.4	16	17.2
Private Institutions	31	5.2	47	8.0	62	10.5	86	14.6
Doctoral	0	0.0	3	10.3	1	3.4	1	3.4
Comprehensive	8	7.4	6	5.6	3	2.8	8	7.4
Baccalaureate	23	5.1	38	8.4	58	12.8	77	17.0
	Secondary Education Programs							
All Institutions	38	3.6	59	5.7	107	10.2	131	12.5
Public Institutions	18	4.2	20	4.7	60	14.0	68	15.8
Doctoral	1	1.1	3	3.2	8	8.5	13	13.8
Comprehensive	17	7.0	14	5.7	33	13.5	42	17.2
Baccalaureate	0	0.0	3	3.3	19	20.7	13	14.1
Private Institutions	20	3.3	39	6.4	47	7.7	63	10.3
Doctoral	0	0.0	1	3.1	1	3.1	0	0.0
Comprehensive	5	4.3	0	0.0	3	2.6	9	7.7
Baccalaureate	15	3.2	38	8.2	43	9.2	54	11.6

*Institutions with the requirement, as a percentage of all institutions with teacher education programs.

II.1a.1 Average Number of Credit Hours Required in All Education Courses by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	Average Number of Credit Hours		Percent Change 80/81–84/85
	1980–81	1984–85	
	Elementary Education Programs		
All Institutions	41.6	43.3	4.1
Public Institutions	42.4	44.0	3.8
Doctoral	42.5	44.9	5.6
Comprehensive	42.2	43.6	3.3
Baccalaureate	42.7	44.4	4.0
Private Institutions	41.1	42.9	4.4
Doctoral	39.5	41.9	6.1
Comprehensive	38.6	39.0	1.0
Baccalaureate	42.3	44.5	5.2
	Secondary Education Programs		
All Institutions	28.2	29.7	5.3
Public Institutions	29.1	30.8	5.8
Doctoral	28.2	30.2	7.1
Comprehensive	29.1	30.7	5.5
Baccalaureate	29.3	31.2	6.5
Private Institutions	27.6	29.1	5.4
Doctoral	23.3	25.0	7.3
Comprehensive	27.4	28.3	3.3
Baccalaureate	28.2	29.8	5.7

II.1a.2 Number of Credit Hours Required in All Education Courses in Elementary Education Programs, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	All Institutions	Number of Institutions Requiring			
		< 30 Credit Hours	30–45 Credit Hours	46–60 Credit Hours	> 60 Credit Hours
	1980–81				
All Institutions	1014	136	511	264	103
Public Institutions	423	68	189	117	49
Doctoral	89	14	39	24	12
Comprehensive	241	38	108	71	24
Baccalaureate	93	16	42	22	13
Private Institutions	591	68	322	147	54
Doctoral	29	4	14	7	4
Comprehensive	108	21	59	24	4
Baccalaureate	454	43	249	116	46
	1984–85				
All Institutions	1032	89	511	287	145
Public Institutions	424	48	206	112	58
Doctoral	89	11	39	24	15
Comprehensive	242	27	119	66	30
Baccalaureate	93	10	48	22	13
Private Institutions	608	41	305	175	87
Doctoral	29	3	14	8	4
Comprehensive	111	15	62	28	6
Baccalaureate	468	23	229	139	77

II.1a.3 Number of Credit Hours Required in All Education Courses in Secondary Education Programs, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	All Institutions	Number of Institutions Requiring			
		< 30 Credit Hours	30–45 Credit Hours	46–60 Credit Hours	> 60 Credit Hours
	1980–81				
All Institutions	1044	699	297	20	28
Public Institutions	430	277	135	1	17
Doctoral	94	57	34	1	2
Comprehensive	244	156	79	0	9
Baccalaureate	92	64	22	0	6
Private Institutions	614	422	162	19	11
Doctoral	32	29	3	0	0
Comprehensive	117	79	31	4	3
Baccalaureate	465	314	128	15	8
	1984–85				
All Institutions	1039	589	401	6	43
Public Institutions	429	221	189	2	17
Doctoral	95	52	39	2	2
Comprehensive	242	118	115	0	9
Baccalaureate	92	51	35	0	6
Private Institutions	610	368	212	4	26
Doctoral	32	25	7	0	0
Comprehensive	114	68	39	4	3
Baccalaureate	464	275	166	0	23

II.1b Average Number of Credit Hours Required in Student Teaching Practicum, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	1980–81			1984–85			Percentage Change in Credit Hours 80/81–84/85
	Insts. with Requirement No.	Insts. with Requirement %*	Ave. No. Credit Hours	Insts. with Requirement No.	Insts. with Requirement %*	Ave. No. Credit Hours	
	Elementary Education Programs						
All Institutions	1009	94.5	9.9	1026	96.1	10.3	4.0
Public Institutions	422	97.2	10.1	421	97.0	10.7	5.9
Doctoral	89	93.7	10.4	88	92.6	10.8	3.8
Comprehensive	240	98.8	10.1	240	98.8	10.5	4.0
Baccalaureate	93	96.9	10.1	93	96.9	10.9	7.9
Private Institutions	587	92.6	9.7	605	95.4	10.2	5.2
Doctoral	29	85.3	9.1	29	85.3	10.0	9.9
Comprehensive	105	87.5	10.1	108	90.0	10.1	0.0
Baccalaureate	453	94.4	9.7	468	97.5	10.2	5.2
	Secondary Education Programs						
All Institutions	1044	97.8	9.3	1037	97.1	9.9	6.5
Public Institutions	431	99.3	9.4	427	98.4	10.1	7.4
Doctoral	95	100.0	9.4	94	98.9	9.8	4.3
Comprehensive	243	100.0	9.4	240	98.8	10.1	7.4
Baccalaureate	93	96.9	9.4	93	96.9	10.3	9.6
Private Institutions	613	96.7	9.3	610	96.2	9.8	5.4
Doctoral	31	91.2	8.2	31	91.2	8.9	8.5
Comprehensive	117	97.5	9.5	114	95.0	9.7	2.1
Baccalaureate	465	96.9	9.3	465	96.9	10.0	7.5

*Institutions with the requirements, as a percentage of all institutions with teacher education programs.

II.1c. Average Number of Credit Hours Required in Principles and Methods of Education, by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	1980–81			1984–85			Percentage Change in Credit Hours 80/81–84/85
	Insts. with Requirement No.	Insts. with Requirement %*	Ave. No. Credit Hours	Insts. with Requirement No.	Insts. with Requirement %*	Ave. No. Credit Hours	
	Elementary Education Programs						
All Institutions	1009	94.5	19.1	1027	96.2	19.9	4.2
Public Institutions	419	96.5	19.6	419	96.5	20.3	3.6
Doctoral	89	93.7	21.3	89	93.7	22.5	5.6
Comprehensive	240	98.8	20.0	240	98.8	20.5	2.5
Baccalaureate	90	93.8	18.3	90	93.8	19.2	4.9
Private Institutions	590	93.1	18.8	608	95.9	19.7	4.8
Doctoral	29	85.3	19.3	29	85.3	19.0	-1.6
Comprehensive	108	90.0	17.0	111	92.5	18.2	7.1
Baccalaureate	453	94.4	19.5	468	97.5	20.4	4.6
	Secondary Education Programs						
All Institutions	1040	97.4	8.4	1037	97.1	9.1	8.3
Public Institutions	427	98.4	8.9	427	98.4	9.6	7.9
Doctoral	94	98.9	9.1	95	100.0	10.1	11.0
Comprehensive	243	100.0	9.3	242	99.6	9.8	5.4
Baccalaureate	90	93.8	8.1	90	93.8	9.0	11.1
Private Institutions	613	96.7	8.1	610	96.2	8.8	8.6
Doctoral	31	91.2	7.3	31	91.2	8.0	9.6
Comprehensive	117	97.5	7.1	114	95.0	7.5	5.6
Baccalaureate	465	96.9	8.6	465	96.9	9.4	9.3

*Institutions with the requirements, as a percentage of all institutions with teacher education programs.

II.1d. Average Number of Clock Hours Required in Early Field Experiences by Control and Type of Institution—1980–81 and 1984–85

Control and Type of Institution	1980–81			1984–85			Percentage Change in Clock Hours 80/81–84/85
	Insts. with Requirement		Ave. No. Clock Hours	Insts. with Requirement		Ave. No. Clock Hours	
	No.	%*		No.	%*		
	Elementary Education Programs						
All Institutions	919	86.0	100.3	989	92.6	112.9	12.6
Public Institutions	374	86.2	90.7	398	91.7	106.4	17.3
Doctoral	80	84.2	124.6	87	91.6	131.8	5.8
Comprehensive	211	86.8	86.8	221	90.9	103.4	19.1
Baccalaureate	83	86.5	86.3	90	93.8	103.3	19.7
Private Institutions	545	86.0	105.9	591	93.2	116.7	10.2
Doctoral	24	70.6	122.0	25	73.5	133.3	9.3
Comprehensive	95	79.2	135.7	102	85.0	137.2	1.1
Baccalaureate	426	88.8	92.7	464	96.7	106.9	15.3
	Secondary Education Programs						
All Institutions	915	85.7	73.2	970	90.8	84.5	15.4
Public Institutions	364	83.9	64.3	392	90.3	77.3	20.2
Doctoral	81	85.3	86.7	88	92.6	92.3	6.5
Comprehensive	203	83.5	63.3	218	89.7	77.6	22.6
Baccalaureate	80	83.3	58.5	86	89.6	71.5	22.2
Private Institutions	551	86.9	78.5	578	91.2	88.7	13.0
Doctoral	22	64.7	77.5	24	70.6	76.7	-1.0
Comprehensive	104	86.7	90.7	101	84.2	100.7	11.0
Baccalaureate	425	88.5	73.9	453	94.4	85.5	15.7

*Institutions with the requirements, as a percentage of all institutions with teacher education programs.

II.2b Institutions That Require Courses in Selected Subject Areas and Degree of Change in Requirements from 1980–81 to 1984–85 in Elementary Education Programs, by Control and Type of Institution

Control and Type of Institution	All Institutions Requiring Courses		Institutions w/ NO CHANGE in Requirements 1980/81–1984/85		Institutions w/ CHANGE in Requirements 1980/81–1984/85	
	No.	%*	No.	%*	No.	%*
			Mathematics			
All Institutions	1043	97.7	832	77.9	211	19.8
Public Institutions	425	97.9	335	77.2	90	20.7
Doctoral	93	97.9	73	76.8	20	21.1
Comprehensive	239	98.4	204	84.0	35	14.4
Baccalaureate	93	96.9	58	60.4	35	36.5
Private Institutions	618	97.5	497	78.3	121	19.1
Doctoral	33	97.1	25	73.5	8	23.5
Comprehensive	120	100.0	89	74.2	31	25.8
Baccalaureate	465	96.9	383	79.8	82	17.1
			Science			
All Institutions	1042	97.6	863	80.8	179	16.8
Public Institutions	422	97.2	351	80.9	71	16.4
Doctoral	93	97.9	73	76.8	20	21.1
Comprehensive	236	97.1	214	88.1	22	9.1
Baccalaureate	93	96.9	64	66.7	29	30.2
Private Institutions	620	97.8	512	80.8	108	17.0
Doctoral	31	91.2	21	61.8	10	29.4
Comprehensive	117	97.5	89	74.2	28	23.3
Baccalaureate	472	98.3	402	83.8	70	14.6
			Communications			
All Institutions	1032	96.6	859	80.4	173	16.2
Public Institutions	412	94.9	343	79.0	69	15.9
Doctoral	91	95.8	74	77.9	17	17.9
Comprehensive	232	95.5	199	81.9	33	13.6
Baccalaureate	89	92.7	70	72.9	19	19.8
Private Institutions	620	97.8	516	81.4	104	16.4
Doctoral	33	97.1	24	70.6	9	26.5
Comprehensive	115	95.8	90	75.0	25	20.8
Baccalaureate	472	98.3	402	83.8	70	14.6
			Computer Science			
All Institutions	499	46.7	201	18.8	298	27.9
Public Institutions	186	42.9	73	16.8	113	26.0
Doctoral	43	45.3	10	10.5	33	34.7
Comprehensive	101	41.6	47	19.3	54	22.2
Baccalaureate	42	43.8	16	16.7	26	27.1
Private Institutions	313	49.4	128	20.2	185	29.2
Doctoral	16	47.1	4	11.8	12	35.3
Comprehensive	65	54.2	28	23.3	37	30.8
Baccalaureate	232	48.3	96	20.0	136	28.3

II.2b—Continued

Control and Type of Institution	All Institutions Requiring Courses		Institutions w/ NO CHANGE in Requirements 1980/81–1984/85		Institutions w/ CHANGE in Requirements 1980/81–1984/85	
	No.	%*	No.	%*	No.	%*
	Arts & Humanities					
All Institutions	226	21.2	145	13.6	81	7.6
Public Institutions	96	22.1	46	10.6	50	11.5
Doctoral	27	28.4	4	4.2	23	24.2
Comprehensive	53	21.8	39	16.0	14	5.8
Baccalaureate	16	16.7	3	3.1	13	13.5
Private Institutions	130	20.5	99	15.6	31	4.9
Doctoral	12	35.3	5	14.7	7	20.6
Comprehensive	36	30.0	24	20.0	12	10.0
Baccalaureate	82	17.1	70	14.6	12	2.5
	Social & Behavioral Science					
All Institutions	196	18.4	133	12.5	63	5.9
Public Institutions	84	19.4	54	12.4	30	6.9
Doctoral	20	21.1	10	10.5	10	10.5
Comprehensive	48	19.8	41	16.9	7	2.9
Baccalaureate	16	16.7	3	3.1	13	13.5
Private Institutions	112	17.7	79	12.5	33	5.2
Doctoral	6	17.6	1	2.9	5	14.7
Comprehensive	39	32.5	27	22.5	12	10.0
Baccalaureate	67	14.0	51	10.6	16	3.3
	Health, Safety, Physical Education					
All Institutions	119	11.1	76	7.1	43	4.0
Public Institutions	49	11.3	34	7.8	15	3.5
Doctoral	12	12.6	3	3.2	9	9.5
Comprehensive	31	12.8	28	11.5	3	1.2
Baccalaureate	6	6.3	3	3.1	3	3.1
Private Institutions	70	11.0	42	6.6	28	4.4
Doctoral	7	20.6	0	0.0	7	20.6
Comprehensive	28	23.3	19	15.8	9	7.5
Baccalaureate	35	7.3	23	4.8	12	2.5

II.2c Institutions That Require Courses in Selected Subject Areas and Degree of Change in Requirements from 1980–81 to 1984–85 in Secondary Education Programs, by Control and Type of Institution

Control and Type of Institution	All Institutions Requiring Courses		Institutions w/ NO CHANGE in Requirements 1980/81–1984/85		Institutions w/ CHANGE in Requirements 1980/81–1984/85	
	No.	%*	No.	%*	No.	%*
			Mathematics			
All Institutions	899	84.2	758	71.0	141	13.2
Public Institutions	361	83.2	304	70.0	57	13.1
Doctoral	78	82.1	67	70.5	11	11.6
Comprehensive	200	82.3	183	75.3	17	7.0
Baccalaureate	83	86.5	54	56.3	29	30.2
Private Institutions	538	84.9	454	71.6	84	13.2
Doctoral	27	79.4	20	58.8	7	20.6
Comprehensive	97	80.8	85	70.8	12	10.0
Baccalaureate	414	86.3	349	72.7	65	13.5
			Science			
All Institutions	973	91.1	861	80.6	112	10.5
Public Institutions	382	88.0	336	77.4	46	10.6
Doctoral	85	89.5	78	82.1	7	7.4
Comprehensive	210	86.4	197	81.1	13	5.3
Baccalaureate	87	90.6	61	63.5	26	27.1
Private Institutions	591	93.2	525	82.8	66	10.4
Doctoral	27	79.4	20	58.8	7	20.6
Comprehensive	108	90.0	99	82.5	9	7.5
Baccalaureate	456	95.0	406	84.6	50	10.4
			Communications			
All Institutions	996	93.3	882	82.6	114	10.7
Public Institutions	404	93.1	352	81.1	52	12.0
Doctoral	88	92.6	80	84.2	8	8.4
Comprehensive	227	93.4	202	83.1	25	10.3
Baccalaureate	89	92.7	70	72.9	19	19.8
Private Institutions	592	93.4	530	83.6	62	9.8
Doctoral	28	82.4	21	61.8	7	20.6
Comprehensive	111	92.5	99	82.5	12	10.0
Baccalaureate	453	94.4	410	85.4	43	9.0
			Computer Science			
All Institutions	482	45.1	238	22.3	244	22.8
Public Institutions	170	39.2	84	19.4	86	19.8
Doctoral	41	43.2	18	18.9	23	24.2
Comprehensive	87	35.8	50	20.6	37	15.2
Baccalaureate	42	43.8	16	16.7	26	27.1
Private Institutions	312	49.2	154	24.3	158	24.9
Doctoral	13	38.2	4	11.8	9	26.5
Comprehensive	59	49.2	34	28.3	25	20.8
Baccalaureate	240	50.0	116	24.2	124	25.8

II.2c—Continued

Control and Type of Institution	All Institutions Requiring Courses		Institutions w/ NO CHANGE in Requirements 1980/81–1984/85		Institutions w/ CHANGE in Requirements 1980/81–1984/85	
	No.	%*	No.	%*	No.	%*
			Arts and Humanities			
All Institutions	208	19.5	129	12.1	79	7.4
Public Institutions	83	19.1	48	11.1	35	8.1
Doctoral	22	23.2	9	9.5	13	13.7
Comprehensive	45	18.5	36	14.8	9	3.7
Baccalaureate	16	16.7	3	3.1	13	13.5
Private Institutions	125	19.7	81	12.8	44	6.9
Doctoral	13	38.2	9	26.5	4	11.8
Comprehensive	31	25.8	22	18.3	9	7.5
Baccalaureate	81	16.9	50	10.4	31	6.5
			Social & Behavioral Science			
All Institutions	159	14.9	127	11.9	32	3.0
Public Institutions	60	13.8	52	12.0	8	1.8
Doctoral	14	14.7	10	10.5	4	4.2
Comprehensive	37	15.2	36	14.8	1	0.4
Baccalaureate	9	9.4	6	6.3	3	3.1
Private Institutions	99	15.6	75	11.8	24	3.8
Doctoral	8	23.5	5	14.7	3	8.8
Comprehensive	25	20.8	19	15.8	6	5.0
Baccalaureate	66	13.8	51	10.6	15	3.1
			Health, Safety, Physical Education			
All Institutions	109	10.2	84	7.9	25	2.3
Public Institutions	37	8.5	33	7.6	4	0.9
Doctoral	7	7.4	6	6.3	1	1.1
Comprehensive	24	9.9	24	9.9	0	0.0
Baccalaureate	6	6.3	3	3.1	3	3.1
Private Institutions	72	11.4	51	8.0	21	3.3
Doctoral	4	11.8	1	2.9	3	8.8
Comprehensive	18	15.0	15	12.5	3	2.5
Baccalaureate	50	10.4	35	7.3	15	3.1

II.4 Changes in Subject Majors Credit Hour Requirements in the Last Five Years in Secondary Education Programs

Control and Type of Institution	Institutions Without Change		Institutions Reporting Change		Ave. Credit Hour Requirements		Percent Change
	No.	%*	No.	%*	Prev.	Curr.	
All Institutions	934	87.5	104	9.7	28.7	31.7	10.5
Public Institutions	381	87.8	50	11.5	29.6	38.0	28.4
Doctoral	83	87.4	12	12.6	28.0	33.0	17.9
Comprehensive	221	90.9	22	9.1	27.6	37.7	36.6
Baccalaureate	77	80.2	16	16.7	33.8	40.4	19.5
Private Institutions	553	87.2	54	8.5	28.3	28.0	-1.1
Doctoral	29	85.3	3	8.8	27.0	36.0	33.3
Comprehensive	98	81.7	16	13.3	28.6	36.5	27.6
Baccalaureate	426	88.8	35	7.3	28.3	23.9	-15.5

*Institutions with the requirement, as a percentage of all institutions with secondary ed. teacher education programs.

II.5 Changes in Subject Matter GPA Requirements in the Last Five Years in Secondary Education Programs

Control and Type of Institution	Institutions Without Change		Institutions Reporting Change		Average GPA Requirements		Percent Change
	No.	%*	No.	%*	Prev.	Curr.	
All Institutions	759	71.1	274	25.7	2.0	2.4	20.0
Public Institutions	298	68.7	133	30.6	1.9	2.3	21.1
Doctoral	70	73.7	25	26.3	1.9	2.3	21.1
Comprehensive	154	63.4	89	36.6	2.1	2.4	14.3
Baccalaureate	74	77.1	19	19.8	1.6	2.2	37.5
Private Institutions	461	72.7	141	22.2	2.1	2.5	19.0
Doctoral	27	79.4	4	11.8	2.0	2.4	20.0
Comprehensive	82	68.3	32	26.7	2.0	2.5	25.0
Baccalaureate	352	73.3	105	21.9	2.2	2.5	13.6

*Institutions with the requirement, as a percentage of all institutions with secondary ed. teacher education programs.

III.1 Scholarship Incentives Used to Attract Students to Teacher Education Programs

Control and Type of Institution	Institutions That Provide Incentive Scholarships to Students with—											
	High Academic Ability		High Ability in									
			Math		Science		Bi-lingual Education		Computer Science		Other Fields	
	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*
All Institutions	258	24.2	196	18.4	182	17.0	88	8.2	62	5.8	83	7.8
Public Institutions	196	45.2	114	26.3	103	23.7	44	10.1	29	6.7	41	9.4
Doctoral	61	64.2	20	21.1	21	22.1	11	11.6	2	2.1	12	12.6
Comprehensive	97	39.9	68	28.0	60	24.7	23	9.5	11	4.5	23	9.5
Baccalaureate	38	39.6	26	27.1	22	22.9	10	10.4	16	16.7	6	6.3
Private Institutions	62	9.8	82	12.9	79	12.5	44	6.9	33	5.2	42	6.6
Doctoral	13	38.2	4	11.8	4	11.8	4	11.8	1	2.9	1	2.9
Comprehensive	34	28.3	12	10.0	9	7.5	5	4.2	5	4.2	6	5.0
Baccalaureate	15	3.1	66	13.8	66	13.8	35	7.3	27	5.6	35	7.3

*Institutions with the program, as a percentage of all institutions with teacher education programs.

III.2 Loan Forgiveness Programs

Control and Type of Institution	Institutions That Offer Loan Forgiveness Program to—									
	All Teacher Education Program Participants		Teacher Education Program Participants Majoring in—							
			Math		Science		Humanities		Other	
	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*
All Institutions	38	3.6	51	4.8	44	4.1	0	0.0	12	1.1
Public Institutions	28	6.5	37	8.5	34	7.8	0	0.0	5	1.2
Doctoral	2	2.1	10	10.5	10	10.5	0	0.0	4	4.2
Comprehensive	20	8.2	27	11.1	24	9.9	0	0.0	1	0.4
Baccalaureate	6	6.3	0	0.0	0	0.0	0	0.0	0	0.0
Private Institutions	10	1.6	14	2.2	10	1.6	0	0.0	7	1.1
Doctoral	1	2.9	0	0.0	0	0.0	0	0.0	0	0.0
Comprehensive	5	4.2	2	1.7	2	1.7	0	0.0	3	2.5
Baccalureate	4	0.8	12	2.5	8	1.7	0	0.0	4	0.8

*Institutions with the program as a percentage of all institution with teacher education programs.

III.3 Recruitment Efforts in the Last Five Years

Control & Type of Institution	Mailings		Visit to College by Students		Visits to High Schools by Coll. Reps		College Fairs Exhibits		Personal Contacts	
	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*
All Institutions	122	11.4	156	14.6	163	15.3	82	7.7	191	17.9
Public Institutions	75	17.3	75	17.3	77	17.7	47	10.8	79	18.2
Doctoral	22	23.2	19	20.0	18	18.9	13	13.7	19	20.0
Comprehensive	40	16.5	47	19.3	43	17.7	24	9.9	45	18.5
Baccalaureate	13	13.5	9	9.4	16	16.7	10	10.4	15	15.6
Private Institutions	47	7.4	81	12.8	86	13.6	35	5.5	112	17.7
Doctoral	1	2.9	6	17.6	2	5.9	4	11.8	5	14.7
Comprehensive	11	9.2	9	7.5	26	21.7	7	5.8	29	24.2
Baccalaureate	35	7.3	66	13.8	58	12.1	24	5.0	78	16.3

Control & Type of Institution	Media Contacts		Loans/Schps		Recruitment at H.S. & Jr. Colls.		Other	
	No.	%*	No.	%*	No.	%*	No.	%*
All Institutions	66	6.2	39	3.7	101	9.5	73	6.8
Public Institutions	39	9.0	21	4.8	70	16.1	41	9.4
Doctoral	6	6.3	4	4.2	15	15.8	7	7.4
Comprehensive	24	9.9	14	5.8	49	20.2	31	12.8
Baccalaureate	9	9.4	3	3.1	6	6.3	3	3.1
Private Institutions	27	4.3	18	2.8	31	4.9	32	5.0
Doctoral	1	2.9	3	8.8	12	35.3	1	2.9
Comprehensive	6	5.0	3	2.5	19	15.8	11	9.2
Baccalaureate	20	4.2	12	2.5	0	0.0	20	4.2

*Institutions with the program as a percentage of all institutions with teacher education programs.

III.4 Recruitment Efforts Under Consideration

Control & Type of Institution	Mailings		Visit to College by Students		Visits to High Schools by Coll. Reps		College Fairs Exhibits		Personal Contacts	
	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*
All Institutions	33	3.1	19	1.8	42	3.9	17	1.6	12	1.1
Public Institutions	13	3.0	6	1.4	26	6.0	16	3.7	6	1.4
Doctoral	3	3.2	2	2.1	6	6.3	3	3.2	3	3.2
Comprehensive	10	4.1	1	0.4	14	5.8	10	4.1	3	1.2
Baccalaureate	0	0.0	3	3.1	6	6.3	3	3.1	0	0.0
Private Institutions	20	3.2	13	2.1	16	2.5	1	0.2	6	0.9
Doctoral	0	0.0	1	2.9	0	0.0	1	2.9	1	2.9
Comprehensive	8	6.7	0	0.0	0	0.0	0	0.0	5	4.2
Baccalaureate	12	2.5	12	2.5	16	3.3	0	0.0	0	0.0

Control & Type of Institution	Media Contacts		Loans/Schps		Recruitment at H.S. & Jr. Colls.		Other	
	No.	%*	No.	%*	No.	%*	No.	%*
All Institutions	22	2.1	104	9.7	32	3.0	63	5.9
Public Institutions	20	4.6	52	12.0	16	3.7	53	12.2
Doctoral	6	6.3	18	18.9	8	8.4	15	15.8
Comprehensive	11	4.5	28	11.5	8	3.3	26	10.7
Baccalaureate	3	3.1	6	6.3	0	0.0	12	12.5
Private Institutions	2	0.3	52	8.2	16	2.5	10	1.6
Doctoral	0	0.0	1	2.9	4	11.8	1	2.9
Comprehensive	2	1.7	12	10.0	0	0.0	5	4.2
Baccalaureate	0	0.0	39	8.1	12	2.5	4	0.8

*Institutions with the program as a percentage of all institutions with teacher education programs.

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

December 21, 1984

Dear Colleague,

Attached is Higher Education Panel Survey No. 67, "Recent Changes in Teacher Education Programs." It is sponsored by the U.S. Department of Education for the purpose of identifying recent changes in teacher preparation programs at the schools, colleges, and departments of education (SCDE) at higher education institutions throughout the country.

Recently attention has been drawn to the issue of quality in elementary and secondary teaching. The objective of this survey is to gauge changes over the last five years at the nation's colleges of education in three areas related to the quality of teachers and their preparation--entry requirements, programmatic changes, and recruitment. We realize that many schools of education have revised their programs in these areas during the seventies, but the focus of this survey is to illuminate trends in the first half of this decade. The results of this study will provide the Department of Education with reliable data needed to develop more effective policies regarding teacher education.

Please understand that your institution's response will be protected to the maximum extent permissible by law. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identifiable with your institution. This survey is authorized by the National Science Foundation Act of 1950, as amended. Although you are not required to respond, your cooperation is needed to make the results comprehensive, reliable, and timely.

The completed questionnaire is due back to the Higher Education Panel by January 31, 1985. If you have any problems or questions, please do not hesitate to telephone us collect at (202)833-4757.

Thank you for your assistance.

Sincerely,

Frank J. Atelsek

Frank J. Atelsek
Panel Director

Enclosure

One Dupont Circle, Washington, D.C. 20036-1193 (202) 833-4757

AMERICAN
COUNCIL ON
EDUCATION

OMB #3145-0009
Exp. 03/31/87

Higher Education Panel Survey No. 67

RECENT CHANGES in TEACHER EDUCATION PROGRAMS

Please indicate the the credit hour system that your institution is currently using

☐ Semester hours
☐ Quarter hours
☐ Other; specify. ______

PART I: Entry Requirements

Indicate the specific minimum requirements at your **school/college/department of education (SCDE)** for admittance into the undergraduate teacher preparation program. Report academic year 1984–85 requirements and those in force in academic year 1980–81.

1. If your SCDE admits freshmen to the program, check here ☐ and proceed to question 4.

2. Was/is a minimum grade point average (GPA) in **general studies courses** required by your SCDE for entry into its teacher education program(s)? If yes, indicate the minimum GPA required for entry.

General studies courses are those outside the SCDE that are generally required of all students at your institution.

3. What is the minimum grade required for completing general studies English course(s) for entry into your SCDE?
If **NOT APPLICABLE,** check here. ☐

	Elementary Education Program		Secondary Education Program	
	1980–81	**1984–85**	**1980–81**	**1984–85**
2.	☐ No ☐ Yes; Minimum GPA: ___	☐ No ☐ Yes; Minimum GPA: ___	☐ No ☐ Yes; Minimum GPA: ___	☐ No ☐ Yes; Minimum GPA: ___
3.	______	______	______	______

4. In order to qualify for admittance into your SCDE's teacher preparation program(s), must a student pass a standardized or proficiency test **in addition to** any required of all students entering your institution?

1980–81
☐ No ☐ Yes. If yes, indicate the name of the test and the minimum score required for admittance.
Elementary Ed. Program. Test name ______________ Minimum passing score ______
Secondary Ed. Program. Test name ______________ Minimum passing score ______

1984–85
☐ No ☐ Yes. If yes, indicate the name of the test and the minimum score required for admittance.
Elementary Ed. Program. Test name ______________ Minimum passing score ______
Secondary Ed. Program. Test name ______________ Minimum passing score ______

5. Are there **other entry requirements,** such as departmental recommendations, mathematics proficiency, speech testing, etc?

Elementary Education Program

☐ No ☐ Yes. If yes, specify the entry requirement(s), and indicate any changes in the requirement that have been made in the last five years (1980/81–1984/85).

Entry Requirement	Changes in the last five years: From	To
______	______	______
______	______	______

Secondary Education Program

☐ No ☐ Yes. If yes, specify the entry requirement(s), and indicate any changes in the requirement that have been made in the last five years (1980/81–1984/85).

Entry Requirement	Changes in the last five years: From	To
______	______	______
______	______	______

Part II: Program Changes

How many credit hours (total) were/are required for a baccalaureate degree in your teacher preparation program?

1980–81 ____ credit hours 1984–85 ____ credit hours

A. In this part, please indicate changes in teacher education programs over the last five academic years (1980–81 to 1984–85).

	Elementary Education Program		**Secondary Education Program**	
1. Indicate for each year and type of program the number of *hours* that a student must have completed in the subjects listed below in order to graduate:	1980–81	1984–85	1980–81	1984–85
a. Credit hours in *all education courses*, including teaching practicum, professional studies, etc.	____	____	____	____
b. Credit hours in student teaching practicum	____	____	____	____
c. Credit hours in principles and methods of education	____	____	____	____
d. Clock hours (not credit hours) in Early Field Experiences	____	____	____	____

2. Has there been a change in the number of credit hours in the specific subject areas listed below that elementary and secondary teacher candidates are required to take?	Elementary Education Program				Secondary Education Program			
		Courses Are Required—				Courses Are Required—		
	Courses Are Not Required	but No Change	No. of Credit Hours Changed		Courses Are Not Required	but No Change	No. of Credit Hours Changed	
			From:	To:			From:	To:
a. Mathematics	☐	☐	____	____	☐	☐	____	____
b. Science	☐	☐	____	____	☐	☐	____	____
c. Communications, oral and written	☐	☐	____	____	☐	☐	____	____
d. Computer science	☐	☐	____	____	☐	☐	____	____
e. Other; specify. ____________	☐	☐	____	____	☐	☐	____	____

3. Since 1980–81, has your teacher preparation program been changed to require students to pass special tests, such as competency tests, comprehensive exams, state or national teachers tests, etc. in order to earn a baccalaureate?

☐ No
☐ Yes. If yes, specify the required test(s).

Elementary Ed. Program ________________________
Secondary Ed. Program ________________________

B. Changes in secondary education programs only.

4. Have the number of credit hours required for *secondary teacher education* students in their subject majors (other than education) changed overall in the last 5 years?

☐ No Change ☐ Yes, changed from ____ hours
to ____ hours

5. For *secondary teacher education* students, did the minimum required grade-point average (GPA) requirements for the subject major(s) change?

☐ No Change ☐ Yes, minimum GPA requirement
changed from ____
to ____

Part III: Teacher Recruitment Efforts

Does your SCDE use any of the practices listed below to attract students into the teacher education program?

Do not include practices or programs that are sponsored by the state or other external agencies such as state-sponsored scholarship programs or loan forgiveness programs. Report only those practices that are sponsored by your SCDE.

1. Provide teacher education scholarships for students of high academic ability ___ Yes ___ No

2. Provide teacher education scholarships for students of high ability in the particular fields listed below:

   Mathematics ___ Yes ___ No

   Science ___ Yes ___ No

   Bilingual education/ESL ___ Yes ___ No

   Computer Science ___ Yes ___ No

   Other; specify ______________ ___ Yes ___ No

3. Offer loan forgiveness to **all** participants in teacher preparation programs if they **engage in classroom teaching** ___ Yes ___ No

4. Offer loan forgiveness to teacher candidates majoring in a particular field only ___ Yes ___ No

   Specify field: ______________________________

   Specify field: ______________________________

5. List below any other recruitment efforts **implemented** at your SCDE over the last five academic years (specify):

6. List below any other recruitment efforts **considered** at your SCDE to encourage students to enter the teacher education program.

Thank you for your assistance. Please return this form by **January 31, 1985** to:

Higher Education Panel
American Council on Education
One Dupont Circle
Washington, DC 20036

Please keep a copy of this form for your records.
Person completing the form:

Name ______________________________

Title ______________________________

Telephone ______________________________

APPENDIX B: TECHNICAL NOTES

The survey instrument was sent to 489 Panel institutions that awarded at least one baccalaureate in education. Excluded were two-year colleges (because they do not grant baccalaureates) and specialized institutions (because so few grant baccalaureates in education). Usable responses were received from 399 institutions, for an overall response rate of 82 percent. Table B-1 shows the population and responses by stratum.

Weighting

Data from 399 institutions were statistically adjusted to represent the population of 1,068 institutions granting baccalaureates in education. Data received from Panel members were adjusted for item and institutional nonresponse within each cell. Then institutional weights were applied to panel data (based on the ratio of responding institutions to the number of institutions in the population) to project estimates representative of the national population.

Comparison of Respondents and Nonrespondents

Table B-2 presents information on survey respondents and nonrespondents on selected variables. Higher than average responses were recorded for doctoral universities, and for large institutions. Institutions with full-time equivalent enrollments of less than 2,000 had lower than average response rates.

Reliability of Survey Estimates

Because the statistics presented in this report are based on a sample, they will differ somewhat from the figures which would have been obtained if a complete census had been taken using the same survey instrument, instructions, and procedures. As in any survey, the results are also subject to reporting and processing errors and errors due to nonresponse. To the extent possible, these types of errors were kept to a minimum by methods built into the survey procedures.

The standard error is primarily a measure of sampling variability—that is, the variations that might occur by chance because only a sample of institutions has been surveyed. Table B-3 presents the 90 percent confidence intervals for question II-1. The 90 percent confidence interval for credit hour requirements in all education courses for students in elementary education programs is plus or minus 1.22. Thus, chances are about 90 out of 100 that a complete survey of all institutions with such programs would have shown the number of credit hours in all education courses required to graduate from an elementary education program to be no more than 44.52 and no less than 42.08.

TABLE B-1—Stratification Design

Cell	Type of Institution	Population	Respondents
	Total	1,068	399
Certainty subdomain			
01	Public universities	95	86
02	Private universities	34	26
03	Public comprehensive	87	68
04	Private comprehensive	20	13
Probability subdomain			
08	Public comprehensive	54	29
09	Public comprehensive	102	36
10	Private comprehensive	100	34
11	Public baccalaureate	96	30
12	Private baccalaureate	120	30
13	Private baccalaureate	360	47

TABLE B-2—Comparison of Respondents and Nonrespondents

(In percentages)

Institutional Characteristics	Respondents (N = 399)	Nonrespondents (N = 90)	Response Rate
Total	100.0	100.0	81.6
Control			
Public	61.4	53.3	83.6
Private	38.6	46.7	78.6
Type			
Doctorate granting	28.1	17.8	87.5
Comprehensive	45.1	47.8	80.7
Baccalaureate	26.8	34.4	77.5
Region			
East	19.8	24.4	78.2
Midwest	27.6	26.7	82.1
South	38.1	35.6	82.6
West	14.5	13.3	82.9
Total undergraduate full-time equivalent enrollment (1981)			
Less than 2,000	24.1	34.4	75.6
2,000–3,999	18.3	20.0	80.2
4,000–7,999	21.6	21.1	81.9
8,000–14,999	21.3	16.7	85.0
15,000 and above	14.8	7.8	89.4

TABLE B-3—Ninety Percent Confidence Intervals for Education Credit Hours, 1984–85, by Control of Institution

Item	All Institutions		Public Institutions		Private Institutions	
	Estimated Hour	Confidence Intervals ±	Estimated Hour	Confidence Intervals ±	Estimated Hour	Confidence Intervals ±
Elementary Education						
Credit hours in all education courses (Part II. 1.a.)	43.3	1.22	44.0	1.26	42.9	1.87
Credit hours in student teaching practicum (Part II. 1.b.)	10.3	0.27	10.7	0.27	10.2	0.41
Credit hours in principles and method of education (Part II. 1.c.)	19.9	1.03	20.3	1.12	19.7	1.55
Secondary Education						
Credit hours in all education courses (Part II. 1.a.)	29.7	0.97	30.8	0.95	29.1	1.49
Credit hours in student teaching (Part II. 1.b.)	9.9	0.27	10.1	0.24	9.8	0.43
Credit hours in principles and method of education (Part II. 1.c.)	9.1	0.62	9.6	0.55	8.8	0.98

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STUDENT FINANCIAL AID TO FULL-TIME UNDERGRADUATES

FALL 1984

Charles J. Andersen

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HIGHLIGHTS

- Nearly half (47 percent) of the full-time, undergraduate students at the nation's universities, four-year and two-year colleges received some form of student financial aid (exclusive of Guaranteed Student Loans) in Academic Year (AY) 1984-85.

- Two out of every five students at public institutions received assistance. At independent institutions the proportion was three out of every five.

- Fifty-four percent of the student aid funds were distributed by public institutions; the remainder (46 percent), by independent colleges and universities.

- About forty percent of the dependent aided undergraduates were from families with incomes of less than $15,000; thirty-five percent were from families with incomes in the $15,000 to $30,000 range; twenty-five percent were from families with incomes above $30,000.

- Grants and scholarships made up nearly half of the typical aid package for low-income students. Loans made up about 20 percent, and employment and the student's own resources, about 16 percent each.

- Typical aid packages for middle-income students provided about 25 percent in the form of grants and scholarships, 25 percent in loans, 15 percent in employment and about 35 percent from the student and his/her family's resources.

- Institutions estimate that a student borrower graduating from a four-year college has an accumulated debt of between $7,000 and $8,000. The debt for a typical borrower graduating from a two-year institution is about half that amount--ranging from $3,600 for low-income borrowers to $4,000 for middle-income borrowers.

- Three-quarters of the independent institutions use an academic year installment plan to facilitate tuition payment. Only one-sixth of the public institutions reported using such an arrangement.

- Nearly all institutions report using federal funds for their college work-study programs. At nearly half of the institutions, these federal funds make up 75 percent or more of all the institution's work-study resources.

- Twenty-nine percent of the institutions reported using state funds for their work-study programs. At two-thirds of those institutions, the state funds accounted for less than a quarter of the institution's work-study resources.

- The amount that freshmen were expected to earn in a year--including both summer work and school-year wages--averaged $1,200 at public institutions and $1,500 at independent colleges. Seniors were expected to earn about $200 more per year than freshmen.

- Undergraduate financial aid from institutional funds in AY 1984-85 was estimated to be $2.3 billion. About one-third of those funds ($800 million) was spent at public institutions; two-thirds ($1.5 billion), at independent colleges and universities.

- Nearly three out of every five dollars of institutionally funded student aid was distributed on the basis of either need only or a combination of need and merit.

- About one-seventh of the institutionally funded student aid was distributed on the basis of athletic ability only.

- In the fall of 1984, fourteen percent of the nation's colleges and universities enrolled more students than they had expected. However, forty-five percent enrolled fewer students than anticipated.

INTRODUCTION

This survey was sponsored by the Department of Education as a means of gathering specific data that would describe the level and composition of student financial aid for undergraduates. It provides estimates for the percentage of full-time undergraduates who received aid in fall 1984, the total amount they received, the distribution of aided students by their families' income level, and the composition of aid packages. In addition, information is provided on student debt, the use of special tuition plans, and how student employment figures in the financial aid packages.

Several of the questions in this survey paralleled those asked in a 1983 study of student aid (1). However, several differences between the surveys (family income levels, classification of student aid packages by income level of the student's family, exclusion of specialized institutions) mean that comparisons between the two studies must be made with caution.

Student financial aid, as used in this report, is restricted to that provided to full-time undergraduates. It includes grants and scholarships, institutionally arranged student employment, and loans. In the discussion of "aid packages", an additional item has been included: "other sources (student's savings, summer earnings, etc.; student's family's contributions, etc.)." The inclusion of this fourth item rounds out the picture of the typical aided student's total resources.

METHODS SUMMARY

The Higher Education Panel is a continuing survey research program created in 1971 by the American Council on Education to conduct specialized surveys on topics of current policy interest both to the higher education community and to government agencies.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities divided into two half-samples of 520 institutions each. This sample was drawn from the population of more than 3,200 institutions listed in the National Center for Education Statistics' Education Directory, Colleges and Universities. All institutions in the population are grouped according to the Panel's stratification design, which is based primarily on three factors: institution type (research university, comprehensive, baccalaureate, specialized, two-year); control or governance (public or independent); and size (measured by full-time-equivalent enrollment). For any given survey, either one of the two half-samples, or an appropriate subgroup of the full Panel is used.

The survey instrument for this study was mailed in January 1985 to those Panel institutions in half-sample number 1 that had undergraduate programs. By the mid-May close of the field phase, after extensive mail and telephone follow-ups, usable data had been received from 350 institutions for a response rate of 75 percent. Data from responding institutions were statistically adjusted to represent the national population of colleges and universities (exclusive of specialized institutions) that provide financial assistance to their undergraduate students. Institutional weights were computed separately for each stratum, based on the ratio of the number of institutions in the population to the number of institutions that responded. Where appropriate, i.e., in the calculation of percentage distribution of students, institutional data were additionally weighted by enrollments prior to the assignment of institutional weights.

Appendix B presents the stratification design used to produce the national estimates and a comparison of respondents and nonrespondents according to various institutional characteristics.

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1. Charles J. Andersen, Financial Aid for Full-time Undergraduates (Washington: American Council on Education, 1984).

FINDINGS

How Many and How Much. Nearly half (47 percent) of the full-time undergraduates enrolled in 2,600 of the nation's colleges and universities[2] received some form of student financial aid administered by their institutions in the fall term of 1984.

This figure varies, depending on the control of the institution--whether it is public or independent--and on its type--whether it is a research university, a comprehensive institution, a baccalaureate college, or a two-year college. Independent baccalaureate colleges show the highest percentage of aided students; public two-year institutions show the lowest.

When institutions are categorized by what it costs, on the average, for freshmen to attend (the freshman student expense budget), those institutions with budgets of less than $5,000 reported that about 40 percent of the students received aid. At those institutions with budgets of $5,000 or more, 53 percent of the undergraduates received aid. Institutions in the $7,500 - $9,999 range reported that two-thirds of their full-time undergraduates received some form of institutionally administered aid.

The total amount of aid distributed was nearly $7.3 billion in academic year 1984-85 and slightly less ($6.8 billion) in the previous year.[3] [4]

In 1984-85 and 1983-84 this aid was divided about equally between the independent and public sectors with a slightly greater proportion in the public sector (53 percent in contrast to 47 percent).

About 30 percent of these funds were awarded to students at colleges with student expense budgets of less than $5,000, institutions that enrolled about half of the full-time aided undergraduates. The remaining 70 percent of the aid was distributed at the institutions with student expense budgets of $5,000 or more. The relatively few institutions with student budgets of $12,500 or more reported about 11 percent of the total; these institutions enroll about 4 percent of the full-time aided undergraduates.

Federal programs provided one half of these aid funds in 1983-84. In 1984-85 the figure dropped to 48 percent. But these are national averages. They blur distinctions due to differences in the type and control of institutions. In 1984-85, for example, two-thirds of the funds at two-year institutions came from federal sources. At the other end of the scale, only 30 percent of the funds distributed through independent universities were federal.[5]

When institutions are classed by their freshman expense budgets, the proportion of federal support is greatest at the low end of the budget scale. Three-quarters of the support awarded at institutions with expense budgets of less than $3,000 per year came from the federal government. In contrast, less than one-quarter of the support at the most expensive institutions came from Washington.

When these percentages are applied to the total amount of student aid, they show that nearly $3.5 billion came from federal undergraduate student aid programs that are administered through the institutions (excluding GSL).

Family Income of Dependent Aided Undergraduates. About two out of five of the dependent aided full-time undergraduates came from families with annual incomes of less than $15,000. Slightly more than one-third (35 percent) came from families in the $15,000 - $29,999 range, and the remaining quarter were from families with even higher incomes.

Major differences in income distribution appear when these data are classified by type and control of institution. At the public two-year community college, nearly three-fifths of the dependent aided full-time undergraduates were from families with incomes of less than $15,000. Less than 10 percent of the dependent aided students at this type of institution came from families with incomes in excess of $30,000. At independent research universities, however, only one fifth of the aided full-time dependent undergraduates came from families with incomes of less than $15,000, while half were from families in the top income category. At public comprehensive colleges, nearly half (47 percent) of the dependent aided students were from families with under $15,000 annual incomes; slightly over one-third (37 percent) were in the $15,000-$29,999 range, and only about one in six were from the most affluent group.

An analysis of the institutions' annual freshman expense budgets supports this picture. The least expensive institutions reported that high proportions of their dependent aided students were from the lower family income ranges. The most expensive institutions showed high proportions of dependent aided students from families in the high range.

---

[2] This report describes student financial aid at all of the nation's colleges and universities except those identified as "specialized" by the National Center for Education Statistics (NCES). Specialized institutions are those that award a high proportion of their degrees in specialized fields such as business, religious studies, the arts, technology, etc.

The percentages of aided students exclude students that used Guaranteed Student Loans only.

[3] These figures should not be compared directly with those reported in HEP Report 60, Financial Aid for Full-time Undergraduates, because that report did include estimates for the specialized institutions.

[4] These dollar amounts cover all assistance delivered to the student through the institution, including institutional and governmental (federal state, and local) student aid such as the Pell grants, National Direct Student Loans, College Work-study, and Supplemental Educational Opportunity Grants. Excluded, however, were Guaranteed Student Loans, veterans' benefits, and social security assistance.

[5] It must be remembered that these figures exclude Guaranteed Student Loans.

Family Income of Independent Aided Undergraduates. Seven-eighths of the independent aided undergraduates had family incomes of less than $15,000. Nearly two-thirds had incomes of less than $6,000. Only one-eighth had incomes of $15,000 or more.

When the data are categorized by the institutions' student expense budgets, the distributions show a great deal of uniformity. Fifty percent of the independent aided undergraduates at the low budget institutions were in families with incomes of less than $6,000. At the most expensive institutions seventy-five percent fell into that income range.

Student Aid Packages. Four sources of funds were identified as components of the undergraduate aid packages: scholarships and grants; student employment; loans; and other sources. This latter category, other sources, was to include the student's and the student's family's contributions from savings, summer earnings, etc. This component is frequently not included in the standard definition of a "financial aid package." However, it was used in this questionnaire in order to get data concerning the provenance of all of the resources used by the student for the year's education.

Institutions also reported the average student expense budget for low-income freshmen and seniors and for middle-income freshmen and seniors. The budgets were to include tuition and fees; room and board charges, if appropriate; books and supplies; transportation; and other expenses. This is basically the same budget definition used by the major student aid agencies.

Grants and scholarships accounted for nearly half of the typical low-income undergraduate student aid package. Student employment accounted for one-sixth, loans for one-fifth, and "other sources" for another sixth.

When public institutions' aid packages for low-income students are compared with those from independent institutions, there are little differences in the shares accounted for by grants and scholarships and by other sources. However, independent institutions reported that loans made up one-quarter of the package and employment one tenth. Public institutions, on the other hand, reported 18 percent for each of these sources.

It may be well to note here that the student expense budgets at independent institutions are about double those at public colleges and universities. Thus, the amount earned --as distinguished from the percentage of the total package--is about the same, whether the low-income student is at a public or independent institution. The difference between student expense budgets plus the higher percentage allotted to loans at independent institutions means that the amount borrowed by low-income students at such institutions is about three times larger than borrowings by comparable students at public institutions.

Little difference is shown in the distributions between the freshman and the senior packages.

Typical student aid packages for middle-income students nationally show scholarships and grants accounting for 25 percent of the total; employment, 14 percent; loans 27 percent; and other sources, 34 percent. The packages for freshmen and seniors do not vary by more than 2 percentage points, regardless of the institutional category and type of aid.

Differences in these middle-income freshman packages appear when the data from public institutions are compared with those from the independent sector. They center on the percentages assigned to scholarships and grants and to employment. A higher percentage of the package is allotted to employment at the public institutions (17 percent) than at the independents (11 percent). To balance things out, at independent institutions scholarships and grants make up a higher proportion (31 percent) than at the public colleges and universities (20 percent).

When institutions are classified by their student expense budgets, little difference appears in the proportion of the low-income freshman's aid package devoted to scholarships and grants, with one exception. That is at the lowest level, the one that includes only public two-year institutions where 41 percent of the package comes from grants and scholarships. The percentage that comes from other sources generally increases as the expense budget increases. Again, the exception to this pattern is at institutions in the least expensive category, where other sources account for more than one-third of the total package. Student employment covers from 9 to 19 percent of the package. Loans account for 10 to 28 percent.

For middle income students, the share of the aid package accounted for by scholarships and grants increases as the student expense budget increases, with the exception of the least expensive category. The share allotted to other sources ranges from 32 to 38 percent--again excluding the least expensive institutional category--with the highest percentage at the most expensive institutions. Student employment accounts for 17 percent of the freshman package at institutions with student budgets of $3,000 to $4,999 and drops to 8 percent at the most expensive institutions. A similar pattern is shown for loans. At the $3,000 to $4,999 expense budget level, they represent 30 percent of the package; at the most expensive institutions they account for 20 percent.

Cumulative Debt. The national average for a typical student borrower's debt burden upon graduation is estimated at between $7,000 and $8,000 for borrowers graduating from four-year colleges and from $3,500 to $4,000 for those completing a two-year institution. These figures are averages based on estimated institutional averages, not on student borrower records. The average for the middle income borrower was 12 percent greater than that for the low-income graduate. This difference was greater at public institutions (30 percent) than at independent ones (2 percent), but the total amount of debt carried by students graduating from independent institutions was almost double that of graduating students at the public institutions. Detailed table series 6 shows that, in general, the more expensive the institution, the greater the typical cumulative debt burden.

Figure 1--Percentage of Full-time Undergraduate Students Who Were Student Aid Recipients, Fall 1984

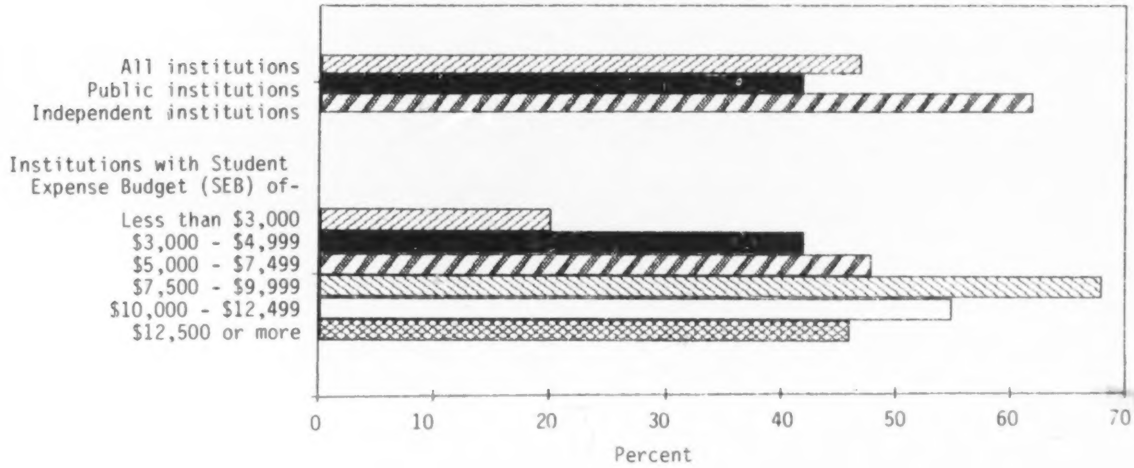


Figure 2--Composition of Typical Student Aid Packages, Fall 1984

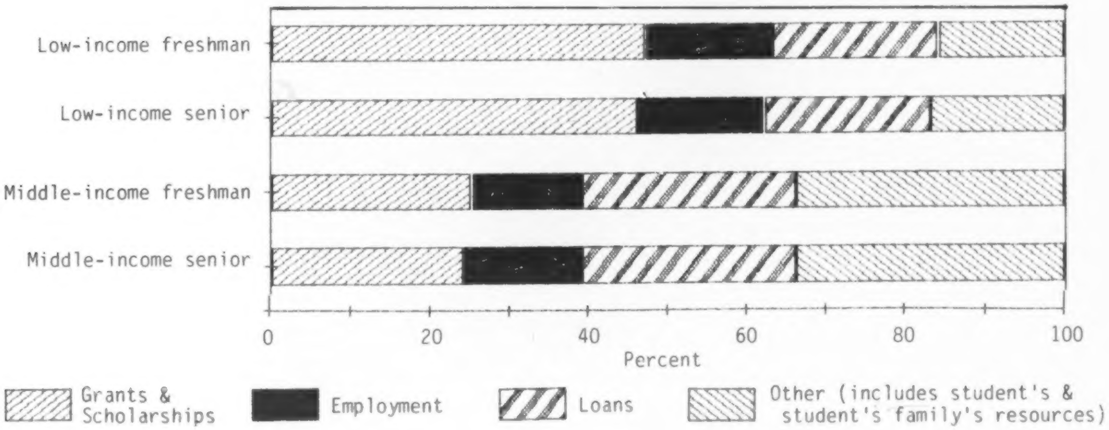
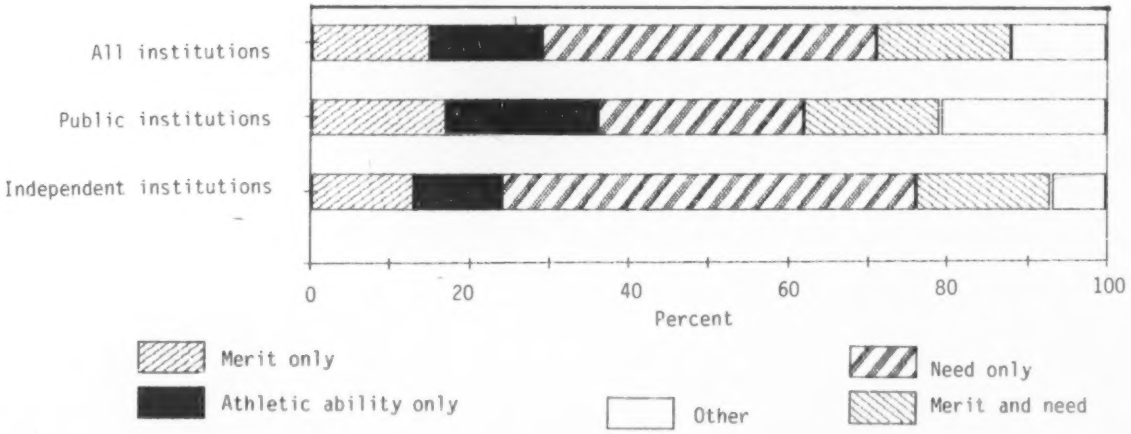


Figure 3--Institutionally Funded Student Aid, by Basis of Award, Fall 1984



Tuition Payment Plans. Just about half of the nation's colleges and universities use one or more of several special tuition payment plans. By far, the largest number of institutions--three-quarters of the independent and nearly one-fifth of the public colleges and universities--use an academic year installment plan. Six percent of all institutions reported the use of special programs that involve students in work intervals that alternate with study periods, such as cooperative education programs. Six percent reported using loans to cover a lump-sum prepaid tuition plan wherein the tuition for the full four-year program is prepaid in return for "freezing" the tuition for the four years at the current level.

The proportion of students using these plans is relatively small. Only seven percent of the students at public institutions were reported to be using the academic year installment plan, and only one percent were using cooperative education. At independent institutions 28 percent of the students were availing themselves of the academic year installment plan, less than one percent using the cooperative education program and one percent using loans for the lump-sum pre-paid tuition plan.

Employment. A special thrust of this survey was directed at the role that employment plays in student financial aid.[6] In addition to getting estimates of the share of the typical aid package accounted for by student employment, the survey requested data on estimates of the total amount that undergraduates were expected to earn annually from all sources. This figure was to include not only what would be included in the "employment" portion of the student aid package, but also the summer earnings portion of the "other sources" part of the package.

Nationally, this figure is estimated at $1,322 for aided freshmen and $1,530 for aided seniors.[6] Students at public institutions are expected to earn less than those at independent colleges and universities. The differential is about $250 for freshmen and $400 for seniors. In general, the more expensive the institution, the more earnings are expected. The exception to this is at the most expensive institutions which reported earnings expectations $150 to $200 less than institutions with student expense budgets of $10,000 to $12,499.

The source of funds that are used to pay students in college work-study programs was also a subject of the questionnaire. Nearly all (98 percent) of the institutions received work-study funds from the federal government. At almost half of the institutions, these federal funds represented three-quarters or more of all the work-study funds available.

State funds were reported by 29 percent of the institutions, most of which were public institutions. The proportion of those institutions with such funds (39 percent) was twice that of the independent sector (18 percent). Most of those institutions with state funds indicated that they represented less than one-quarter of the total work-study funds used.

Nine out of ten institutions reported using institutional funds. However, half of these institutions reported that such funds represented less than one-quarter of their work-study aid. The ambiguity of state and institutional funds at state-controlled institutions may be the reason that the proportion of institutions with "institutional" funds is less than 100 percent.

Institutionally Funded Student Aid. Two and one third billion dollars worth of the student financial aid described in this report came from institutional funds. Nearly two thirds of this total was awarded at independent institutions; $850 million was at public colleges and universities.

Two-fifths of this institutionally funded aid was distributed on the basis of need only, fifteen percent was awarded on the basis of academic or artistic merit only; 14 percent, on the basis of athletic ability only; and an additional 17 percent of it was awarded on the basis of need and merit. This last category was defined to mean selection of the awardee on the basis of merit and determination of the size of the award on the basis of need. A final "other" category that was not defined on the questionnaire accounted for 12 percent of the total.

Independent institutions reported that over half of their institutional aid was distributed on the basis of need only; the comparable figure for public colleges and universities was 27 percent. Just over one-tenth of the institutional aid at independent institutions was awarded on the basis of athletic ability only; the comparable share at public institutions was nearly one-fifth. Academic or artisitic ability only was the basis for awarding 13 percent of the institutional funds at independent institutions; for public colleges and universities the comparable figure was 17 percent.

Those institutions with the highest student expense budgets awarded awarded 84 percent of their institutional aid on the basis of need only. Ten percent went on the basis of need and ability; only 3 percent was awarded on the basis of merit only. Institutions with student expense budgets of $3,000 - $4,999 reported that 22 percent of their institutional aid funds was awarded on the basis of academic or artistic merit only, 23 percent on the basis of athletic ability only, and 28 percent on the basis of need only or need and merit.

Enrollment Targets. The survey included a final question only peripherally related to undergraduate student aid. It asked whether the institution's fall 1984 enrollment exceeded, met, or fell short of the planned target. Nationally, two-fifths of the institutions reported enrollments as planned. Fourteen percent reported more students than projected. However, forty-five percent reported fewer students than they had planned for. Just over half (53 percent) of the public institutions reported fewer students and 11 percent reported more than planned. Slightly more than one third (36 percent) of the independent institutions reported fewer students, 19 percent reported more students and 45 percent of these institutions reported enrollments as planned.

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[6] Data have been weighted by estimated enrollments.

Two thirds of the institutions with the highest student expense budgets reported more students than planned; only five percent of these institutions reported missing enrollment targets. Fifty-five percent of the institutions with low to moderate student expense budgets ($3,000 - $4,999) reported fewer students than planned. Only ten percent of these reported exceeding planned enrollment levels. None of the institutions in the lowest expense budget range (less than $3,000) reported more students than planned; four out of ten reported fewer than planned. Such figures indicate that elements other than price alone are determinants of demand for postsecondary education.

SUMMARY

This survey, which covered all types of postsecondary education institutions except specialized institutions indicates that nearly half of the full-time undergraduate students are receiving some sort of aid that is administered by the attended institution. This figure excludes students that had Guaranteed Student Loans (GSLs) only; it also excluded students with veterans or social security benefits only.

The aid awarded to these students amounted to slightly more than $7 billion for academic year 1984-85. Of this amount, nearly half came from the federal government. Whereas the total amount of student aid increased slightly between 1983-84 and 1984-85, the federal share dropped by two percentage points.

The family income of aided dependent undergraduates is directly related to how expensive the attended school is. At public institutions--generally less expensive than independent ones--the proportion of students from families with incomes of $30,000 or more is half that of independent institutions. One-fifth of the aided undergraduates at the least expensive institutions come from families with incomes of $6,000 or less. Only five percent of the aided undergraduates at the most expensive institutions come from such families.

Grants and scholarships make up nearly half of the typical student aid package for low-income students, but only one quarter for middle-income students. The proportion that typically comes from the student and his/her family is one-sixth of the total for the low-income student and one-third for the middle income student.

The cumulative debt of the typical borrower upon graduation from a four-year institution is approximately twice that of the typical borrower at two-year institutions. Overall, the typical middle-income borrower accumulates a debt about 12 percent greater than the low-income borrower. At the more expensive four-year colleges, however, the low-income student may end with a slightly greater debt.

The total average earnings expected of dependent freshmen was $1,300 nationally, a figure that represented one-fifth to one-quarter of the average student expense budget, depending on the student's family income level. For seniors the expected earnings were $1,500, from 24 to 30 percent of the average senior student expense budget.

Nearly all institutions used federal college-work study funds. The federal government was the most important source of most institutions' work-study aid.

Institutionally funded student aid amounted to $2.3 billion in 1984-85, an amount equal to about thirty percent of all aid awarded (excluding GSLs, social security, and veterans benefits). Three-fifths of these funds were awarded by independent institutions, and most of them according to the recipients' need or a combination of need and academic or artistic merit. Less than one-fifth were awarded on the basis of athletic ability only.

Half of the public colleges and universities reported that their fall 1984 enrollments were smaller than what they had expected. Only 11 percent of the public colleges reported more students than planned. In the independent sector, just over one third of the institutions enrolled fewer students than planned, and one-fifth had more than expected.

DETAILED STATISTICAL TABLES

Table 1--Total Full-time Undergraduate Enrollment and Percentage of Students Receiving Student Aid, Fall 1984

(In thousands)

	Full-time Undergraduates	
	Number	Percent with Aid
All institutions	**7,065.2**	**47%**
Control and Type of Institution		
All public institutions	5,513.9	42
Research universities	1,639.8	46
Comprehensive universities	1,491.9	45
Baccalaureate colleges	308.9	57
Two-year colleges	2,073.3	36
All independent institutions	1,551.4	62
Research universities	296.6	51
Comprehensive universities	379.8	56
Baccalaureate colleges	600.0	69
Two-year colleges	275.1	65
Student Expense Budget (SEB)		
Institutions with SEB of		
Less than $3,000	193.4	20
$3,000 - $4,999	3,388.7	42
$5,000 - $7,499	2,154.5	48
$7,500 - $9,999	696.4	68
$10,000 - $12,499	382.4	55
$12,500 or over	249.8	46

Table 2--Total Student Aid Provided Full-time Undergraduate Students, 1983-84 and 1984-85

(In millions of dollars)

Control and Type of Institution	Total Financial Aid *		Percent Change
	1983-84	1984-85	
All institutions	**$6,935.0**	**$7,437.0**	**7%**
Control & Type of Institution			
All public institutions	3,765.4	3,999.9	6
Research universities	1,398.6	1,475.3	5
Comprehensive universities	1,215.4	1,309.6	8
Baccalaureate colleges	287.3	297.3	3
Two-year colleges	864.0	917.7	6
All independent institutions	3,169.6	3,437.1	8
Research universities	733.1	785.3	7
Comprehensive universities	717.1	779.3	9
Baccalaureate colleges	1,270.9	1,395.0	10
Two-year colleges	448.5	477.5	6
Student Expense Budget (SEB)			
Institutions with SEB of			
Less than $3,000	41.2	45.4	10
$3,000 - $4,999	2,159.3	2,249.2	4
$5,000 - $7,499	2,015.5	2,182.5	8
$7,500 - $9,999	1,317.0	1,445.0	10
$10,000 - $12,499	713.8	759.0	6
$12,500 or over	688.2	755.9	10

* All forms of student financial assistance that use the institution as the delivery agent, except social security benefits, veterans benefits, and GSLs. Includes Pell grants, remission of tuition and fees, institutionally-arranged student employment, and loans (except GSLs).

Table 3--Federal Student Aid as a Percentage of All Student Aid, 1983-84 and 1984-85

	Percentage	
	1983-84	1984-85
All institutions	**50**	**49**
Control & Type of Institution		
All public institutions	60	59
Research universities	52	52
Comprehensive universities	61	57
Baccalaureate colleges	67	68
Two-year colleges	68	68
All independent institutions	39	37
Research universities	30	27
Comprehensive universities	30	28
Baccalaureate colleges	40	39
Two-year colleges	67	65
Student Expense Budget (SEB)		
Institutions with SEB of		
Less than $3,000	77	77
$3,000 - $4,999	64	63
$5,000 - $7,499	57	56
$7,500 - $9,999	39	38
$10,000 - $12,499	35	32
$12,500 or over	24	21

TABLE 4.1--Student Aid Recipients, by Family Income Level, Fall 1984
Dependent Students

Control and Type of Institution	Percentage of Students from Families with Income of-				All
	Under $6,000	$6,000- $14,999	$15,000- $29,999	$30,000 or more	
All institutions	**13.9**	**24.7**	**34.9**	**26.5**	**100.0**
Control & Type of Institution					
All public institutions	16.9	28.6	35.7	18.9	100.0
Research universities	9.9	21.7	38.2	30.2	100.0
Comprehensive universities	17.9	28.9	36.5	16.7	100.0
Baccalaureate colleges	24.7	34.4	31.9	9.0	100.0
Two-year colleges	22.8	35.9	32.2	9.1	100.0
All independent institutions	8.5	17.4	33.5	40.6	100.0
Research universities	6.0	14.0	29.0	51.0	100.0
Comprehensive universities	6.9	13.9	33.3	45.9	100.0
Baccalaureate colleges	9.0	19.4	35.9	35.6	100.0
Two-year colleges	11.9	20.5	31.9	35.7	100.0
Student Expense Budget (SEB)					
Institutions with SEB of					
Less than $3,000	21.4	42.6	33.4	2.6	100.0
$3,000 - $4,999	21.2	32.7	34.9	11.2	100.0
$5,000 - $7,499	10.5	21.8	36.0	31.7	100.0
$7,500 - $9,999	9.5	19.4	35.7	35.5	100.0
$10,000 - $12,499	6.3	14.5	32.1	47.0	100.0
$12,500 or over	5.3	12.1	29.6	53.0	100.0

TABLE 4.2--Student Aid Recipients, by Family Income Level, Fall 1984
Independent Students

Institution	Percentage of Students from Families with Income of-				All
	Under $6,000	$6,000- $14,999	$15,000- $29,999	$30,000 or more	
All institutions	**63.1**	**25.3**	**8.9**	**2.6**	**100.0**
Type & Control of Institution					
All public institutions	63.2	25.9	8.7	2.1	100.0
Research universities	67.7	20.5	8.2	3.6	100.0
Comprehensive universities	72.0	20.0	6.8	1.3	100.0
Baccalaureate colleges	56.7	23.7	13.9	5.8	100.0
Two-year colleges	56.6	33.2	9.2	1.0	100.0
All independent institutions	62.8	22.0	9.7	5.6	100.0
Research universities	72.5	16.2	4.8	6.5	100.0
Comprehensive universities	62.4	24.2	12.7	.8	100.0
Baccalaureate colleges	60.8	25.4	10.3	3.5	100.0
Two-year colleges	63.1	17.1	8.5	11.3	100.0
Student Expense Budget (SEB)					
Institutions with SEB of					
Less than $3,000	48.8	38.8	12.3	.2	100.0
$3,000 - $4,999	62.5	26.7	9.1	1.7	100.0
$5,000 - $7,499	64.9	22.6	7.9	4.5	100.0
$7,500 - $9,999	62.3	25.1	11.1	1.6	100.0
$10,000 - $12,499	66.8	20.5	7.9	4.8	100.0
$12,500 or over	75.0	17.1	6.3	1.6	100.0

Table 5.1--Composition of Student Aid Packages and Average Student Expense Budget, Fall 1984
Low-income Freshmen

	Percentage of Typical Aid Package from-					Average Expense Budget
	Grants & Scholarships	Employment	Loans	Other Sources	Total	
All institutions	47	16	21	16	100	$5,374
Type & Control of Institution						
All public institutions	48	18	18	16	100	$4,428
Research universities	50	15	18	17	100	5,425
Comprehensive universities	47	17	20	15	100	4,584
Baccalaureate colleges	44	19	24	13	100	4,271
Two-year colleges	47	21	15	17	100	4,024
All independent institutions	47	10	27	16	100	8,770
Research universities	44	11	22	23	100	12,669
Comprehensive universities	49	10	24	17	100	10,244
Baccalaureate colleges	51	10	23	17	100	8,013
Two-year colleges	43	11	35	13	100	7,796
Student Expense Budget (SEB)						
Institutions with SEB of						
Less than $3,000	41	13	11	34	100	$2,841
$3,000 - $4,999	48	19	17	16	100	4,000
$5,000 - $7,499	47	16	22	16	100	5,892
$7,500 - $9,999	47	11	28	15	100	8,496
$10,000 - $12,499	48	10	23	19	100	11,137
$12,500 or over	48	9	18	25	100	13,945

Table 5.2--Composition of Student Aid Packages and Average Student Expense Budget, Fall 1984
Low-income Seniors

	Percentage of Typical Aid Package from-					Average Expense Budget
	Grants & Scholarships	Employment	Loans	Other Sources	Total	
All institutions	**45**	**16**	**21**	**17**	**100**	**$5,449**
Control & Type of Institution						
All public institutions	45	19	19	17	100	$4,487
Research universities	44	17	20	19	100	5,484
Comprehensive universities	45	18	20	16	100	4,607
Baccalaureate colleges	42	21	24	13	100	4,288
Two-year colleges	46	21	16	18	100	4,041
All independent institutions	45	11	26	17	100	8,817
Research universities	41	12	22	24	100	12,623
Comprehensive universities	48	11	24	17	100	10,229
Baccalaureate colleges	49	10	23	18	100	7,958
Two-year colleges	42	11	35	13	100	7,866
Student Expense Budget (SEB)						
Institutions with SEB of						
Less than $3,000	40	13	10	36	100	$2,841
$3,000 - $4,99	45	20	18	16	100	4,043
$5,000 - $7,499	44	17	21	17	100	5,910
$7,500 - $9,999	45	11	28	16	100	8,498
$10,000 - $12,499	46	11	23	20	100	11,130
$12,500 or over	45	10	20	26	100	13,865

Table 5.3--Composition of Student Aid Packages and Average Student Expense Budget, Fall 1984
Middle-income Freshmen

	Percentage of Typical Aid Package from-					Average Expense Budget
	Grants & Scholarships	Employment	Loans	Other Sources	Total	
All institutions	**25**	**14**	**27**	**34**	**100**	**$6,199**
Control and Type of Institution						
All public institutions	20	17	28	36	100	$4,671
Research universities	15	15	25	45	100	5,579
Comprehensive universities	18	18	30	34	100	4,752
Baccalaureate colleges	21	22	33	24	100	4,312
Two-year colleges	25	17	28	31	100	4,077
All independent institutions	31	11	26	32	100	9,253
Research universities	30	10	23	36	100	12,818
Comprehensive universities	32	11	24	32	100	10,479
Baccalaureate colleges	35	10	24	31	100	8,401
Two-year colleges	24	14	32	29	100	7,768
Student Expense Budget (SEB)						
Institutions with SEB of						
Less than $3,000	28	15	16	41	100	$2,839
$3,000 - $4,999	20	17	30	33	100	4,060
$5,000 - $7,499	21	16	27	37	100	5,960
$7,500 - $9,999	31	12	26	31	100	8,575
$10,000 - $12,499	33	10	24	33	100	11,133
$12,500 or over	33	8	20	39	100	13,944

Table 5.4--Composition of Student Aid Packages and Average Student Expense Budget, Fall 1984
Middle-income Seniors

	Percentage of Typical Aid Package from-					Average Expense Budget
	Grants & Scholarships	Employment	Loans	Other Sources	Total	
All institutions	**24**	**15**	**27**	**34**	**100**	**$6,287**
Control and Type of Institution						
All public institutions	19	18	28	36	100	$4,743
Research universities	14	16	25	44	100	5,643
Comprehensive universities	17	19	29	34	100	4,763
Baccalaureate colleges	20	23	33	24	100	4,333
Two-year colleges	24	17	28	31	100	4,102
All independent institutions	29	12	26	33	100	9,314
Research universities	28	12	24	36	100	12,804
Comprehensive universities	31	12	24	33	100	10,459
Baccalaureate colleges	33	10	25	32	100	8,319
Two-year colleges	24	14	33	29	100	7,880
Student Expense Budget (SEB)						
Institutions with SEB of						
Less than $3,000	27	15	16	43	100	$2,839
$3,000 - $4,999	19	18	30	33	100	4,114
$5,000 - $7,499	19	17	27	37	100	5,982
$7,500 - $9,999	29	13	27	32	100	8,565
$10,000 - $12,499	31	11	24	34	100	11,139
$12,500 or over	31	9	21	38	100	13,912

Table 6.1--Typical Student Borrower's Cumulative Debt upon Graduation, Academic Year 1984-85

(Institutional Average)

	Cumulative Debt of Single Dependent Student from- Low Income Family	Middle Income Family
All institutions	**$5,328**	**$5,985**
Control and Type of Institution		
All public institutions	3,630	4,684
Research universities	4,823	6,848
Comprehensive universities	5,302	6,982
Baccalaureate colleges	5,299	7,358
Two-year colleges	2,773	3,397
All independent institutions	7,395	7,568
Research universities	9,887	9,962
Comprehensive universities	9,740	9,458
Baccalaureate colleges	7,657	8,094
Two-year colleges	5,566	5,511

Note: The number of students with cumulative debt at the end of their studies was not requested. Thus, these data were institutionally weighted; they were not weighted by the number of student borrowers.

Table 6.2--Typical Student Borrower's Cumulative Debt upon Graduation, by Student Expense Budget Range, Family Income, and Type of Institution, Academic Year 1984-85

(Institutional Average)

	Cumulative Debt of Single Dependent Student from-			
	Low-income Family		Middle-income Family	
	4-year Colleges	2-year Colleges	4-year Colleges	2-year Colleges
All institutions	**$7,058**	**$3,557**	**$7,934**	**$3,991**
Less than $3,000	0	1,985	0	1,864
$3,000 - $4,999	4,584	2,943	6,497	3,626
$5,000 - $7,499	5,557	4,330	7,024	4,771
$7,500 - $9,999	8,619	5,991	8,728	5,790
$10,000 - $12,499	9,783	4,200	9,759	4,700
$12,500 or over	10,038	0	9,953	0

Note: Figures are institutionally weighted estimates.

Table 7.1--Percentage of Institutions Using Tuition Payment Programs, Fall 1984

	Percentage of Institutions Using -						
	Install-ment Plan	Lump-sum Prepaid Tuition	Loans for Prepaid Tuition	Work & Education Programs	Other	Any Plan*	None of the Plans Listed
All institutions	**44.1**	**1.7**	**6.1**	**6.3**	**9.2**	**51.7**	**48.3**
Control and Type of Institution							
All public institutions	17.9	.7	1.7	8.1	7.9	29.8	70.2
Research universities	30.8	2.6	2.6	25.6	10.3	51.3	48.7
Comprehensive universities	36.0	2.7	4.3	20.0	15.6	56.7	43.3
Baccalaureate colleges	27.8	.0	5.6	11.1	5.6	44.4	55.6
Two-year colleges	9.8	.0	.3	2.2	5.6	17.4	82.6
All independent institutions	76.1	3.0	11.5	4.2	10.8	78.4	21.6
Research universities	81.8	31.8	22.7	22.7	9.1	86.4	13.6
Comprehensive universities	75.7	6.1	24.1	10.2	11.2	81.8	18.2
Baccalaureate colleges	82.7	1.3	9.9	1.3	17.3	85.3	14.7
Two-year colleges	64.3	.0	7.2	3.5	.0	64.3	35.7
Student Expense Budget (SEB)							
Institutions with SEB of							
Less than $3,000	.0	.0	.0	7.5	.0	7.5	92.5
$3,000 - $4,999	15.9	.0	.3	6.4	7.1	25.4	74.6
$5,000 - $7,499	52.7	.5	12.0	8.2	8.5	62.8	37.2
$7,500 - $9,999	79.0	.0	4.3	4.2	12.5	82.2	17.8
$10,000 - $12,499	77.1	11.0	24.6	8.1	20.7	83.3	16.7
$12,500 or over	88.0	31.1	25.8	3.3	6.6	88.0	12.0

* Unduplicated count of institutions using one or more of the listed tuition plans.

Table 7.2--Percentage of Students Using Selected Tuition Payment Programs, Fall 1984

	Install-ment Plan	Lump-sum Prepaid Tuition	Loans for Prepaid Tuition	Work & Education Program	Other
All institutions	**11.1**	**.1**	**.3**	**1.0**	**2.2**
Control and Type of Institution					
All public institutions	6.5	.0	.0	1.1	2.2
Research universities	8.8	.0	.0	1.9	2.1
Comprehensive universities	5.8	.1	.1	1.1	3.8
Baccalaureate colleges	12.6	.0	.1	2.8	.8
Two-year colleges	4.4	.0	.0	.1	1.4
All independent institutions	27.5	.1	1.1	.6	2.2
Research universities	21.7	.5	.5	.6	.6
Comprehensive universities	22.1	.1	1.6	1.7	.4
Baccalaureate colleges	31.6	.0	.7	.1	5.1
Two-year colleges	32.0	.0	1.9	.4	.0
Student Expense Budget (SEB)					
Institutions with SEB of					
Less than $3,000	.0	.0	.0	.2	.0
$3,000 - $4,999	6.0	.0	.0	1.1	3.2
$5,000 - $7,499	9.7	.0	.4	1.1	.5
$7,500 - $9,999	37.1	.0	1.0	.5	4.9
$10,000 - $12,499	14.6	.6	.8	1.4	.6
$12,500 or over	24.3	.4	.3	.1	.8

Table 8.1-- Institutions Receiving College Work-study (CW-S) Funds from the Federal Government, by Control and Type of Institution, Fall 1984

	All Institutions		Percent of Institutions-		Percent of Institutions Where Federal Funds Represent-		
	No.	%	without Federal CW-S Funds	with Federal CW-S Funds	<25% of All CW-S Funds	25%-74% of All CW-S Funds	75% or More of All CW-S Funds
All institutions	2,650	100	2	98	5	45	47
Control and Type of Institution							
All public institutions	1,455	100	1	100	4	38	57
Research universities	104	100	3	97	18	46	33
Comprehensive universities	282	100	1	99	12	42	45
Baccalaureate colleges	127	100	0	100	0	39	61
Two-year colleges	942	100	0	100	1	36	63
Independent institutions	1,195	100	4	96	7	54	35
Research universities	58	100	0	100	5	50	45
Comprehensive universities	157	100	0	100	13	53	34
Baccalaureate colleges	612	100	0	100	9	60	31
Two-year colleges	368	100	14	86	4	42	39
Student Expense Budget (SEB)							
Institutions with SEB of-							
Less than $3,000	121	100	0	100	5	39	57
$3,000 - $4,999	1,074	100	1	100	2	38	59
$5,000 - $7,499	587	100	9	91	12	38	41
$7,500 - $9,999	617	100	0	100	5	54	41
$10,000 - $12,499	171	100	0	100	6	73	22
$12,500 or more	80	100	0	100	15	70	15

Table 8.2--Institutions Receiving College Work-study (CW-S) Funds from State Governments by Control and Type of Institution, Fall 1984

	All Institutions		Percent of Institutions-		Percent of Institutions Where State Funds Represent-		
	No.	%	without State CW-S Funds	with State CW-S Funds	< 25% of All CW-S Funds	25%-74% of All CW-S Funds	75% or More of All CW-S Funds
All institutions	2,650	100	71	29	20	9	1
Control and Type of Institution							
All public institutions	1,455	100	61	39	26	13	1
Research universities	104	100	59	41	33	8	0
Comprehensive universities	282	100	46	54	27	25	2
Baccalaureate colleges	127	100	56	44	39	6	0
Two-year colleges	942	100	66	34	23	11	0
Independent institutions	1,195	100	82	18	13	5	0
Research universities	58	100	68	32	32	0	0
Comprehensive universities	157	100	67	33	25	8	0
Baccalaureate colleges	612	100	84	16	15	1	0
Two-year colleges	368	100	89	11	0	11	0
Student Expense Budget (SEB)							
Institutions with SEB of-							
Less than $3,000	121	100	70	60	12	18	0
$3,000 - $4,999	1,074	100	64	36	25	10	0
$5,000 - $7,499	587	100	69	31	19	10	1
$7,500 - $9,999	617	100	86	14	7	7	0
$10,000 - $12,499	171	100	73	27	19	8	0
$12,500 or more	80	100	42	58	58	0	0

Table 8.3--Institutions Receiving College Work-study (CW-S) Funds from Institutional Funds, by Control and Type of Institution, Fall 1984

	All Institutions		Percent of Institutions-		Percent of Institutions Where Institutional Funds Represent-		
	No.	%	without institutional CW-S Funds	with institutional CW-S Funds	<25% of All CW-S Funds	25%-74% of All CW-S Funds	75% or More of All CW-S Funds
All institutions	**2,650**	**100**	**11**	**89**	**45**	**36**	**7**
Control and Type of Institution							
All public institutions	1,455	100	16	84	57	25	3
Research universities	104	100	8	92	39	34	21
Comprehensive universities	282	100	28	72	40	29	2
Baccalaureate colleges	127	100	11	89	73	17	0
Two-year colleges	942	100	14	86	61	24	1
Independent institutions	1,195	100	6	94	32	50	12
Research universities	58	100	14	86	32	50	5
Comprehensive universities	157	100	4	96	33	51	11
Baccalaureate colleges	612	100	0	100	31	59	10
Two-year colleges	368	100	14	86	32	36	18
Student Expense Budget (SEB)							
Institutions with SEB of-							
Less than $3,000	121	100	21	79	49	24	5
$3,000 - $4,999	1,074	100	15	85	58	25	2
$5,000 - $7,499	587	100	11	89	37	35	17
$7,500 - $9,999	617	100	6	94	41	27	6
$10,000 - $12,499	171	100	0	100	28	69	4
$12,500 or more	80	100	7	93	9	69	15

Table 8.4--Institutions Receiving College Work-study (CW-S) Funds from Other Sources by Control and Type of Institution, Fall 1984

	All Institutions		Percent of Institutions-		Percent of Institutions Where Other Funds Represent-		
	No.	%	without Other CW-S Funds	with Other CW-S Funds	<25% of All CW-S Funds	25%-74% of All CW-S Funds	75% or More of All CW-S Funds
All institutions	**2,650**	**100**	**91**	**9**	**9**	**1**	**0**
Control and Type of Institution							
All public institutions	1,455	100	91	9	8	1	0
Research universities	104	100	87	13	13	0	0
Comprehensive universities	282	100	85	15	15	0	0
Baccalaureate colleges	127	100	89	11	6	6	0
Two-year colleges	942	100	94	6	6	0	0
Independent institutions	1,195	100	91	9	9	0	0
Research universities	58	100	95	5	5	0	0
Comprehensive universities	157	100	96	4	4	0	0
Baccalaureate colleges	612	100	90	10	10	0	0
Two-year colleges	368	100	89	11	11	0	0
Student Expense Budget (SEB)							
Institutions with SEB of-							
Less than $3,000	121	100	93	7	7	0	0
$3,000 - $4,999	1,074	100	94	6	6	1	0
$5,000 - $7,499	587	100	86	14	14	0	0
$7,500 - $9,999	617	100	91	9	8	0	0
$10,000 - $12,499	171	100	88	12	13	0	0
$12,500 or more	80	100	97	3	3	0	0

Table 9--Average Earnings Expected to Go to Educational Expenses, by Student Level, Fall 1984

	Earnings of	
	Freshmen	Seniors
All institutions	**$1,322**	**$1,530**
Control and Type of Institution		
All public institutions	1,205	1,397
Research universities	1,410	1,714
Comprehensive universities	1,112	1,357
Baccalaureate colleges	1,054	1,174
Two-year colleges	1,146	1,216
All independent institutions	1,555	1,791
Research universities	2,338	2,720
Comprehensive universities	1,676	1,935
Baccalaureate colleges	1,336	1,592
Two-year colleges	1,364	1,441
Student Expense Budget (SEB)		
Institutions with SEB of		
Less than $3,000	949	1,010
$3,000 - $4,999	1,113	1,252
$5,000 - $7,499	1,299	1,529
$7,500 - $9,999	1,468	1,705
$10,000 - $12,499	2,132	2,427
$12,500 or over	1,908	2,269

Note: Data have been weighted by estimated enrollments.

Table 10--Institutionally Funded Student Aid, by Basis of Award, Fall 1984

	Institutional Aid		Percent of Aid Awarded on Basis of-				
	Amount*	Percent	Merit Only	Athletic Ability Only	Need Only	Merit & Need	Other Criteria
All institutions	**$2,328.1**	**100%**	**15%**	**14%**	**42%**	**17%**	**12%**
Control and Type of Institution							
All public institutions	847.2	100	17	19	27	17	21
Research universities	432.0	100	14	20	30	13	24
Comprehensive universities	302.3	100	16	17	27	21	20
Baccalaureate colleges	38.7	100	43	31	10	11	5
Two-year colleges	74.2	100	27	11	20	28	15
All independent institutions	1,480.9	100	13	11	51	17	7
Research universities	421.8	100	9	7	68	10	6
Comprehensive universities	486.3	100	13	18	45	21	3
Baccalaureate colleges	502.8	100	17	8	44	20	12
Two-year colleges	69.9	100	13	5	45	24	14
Student Expense Budget (SEB)							
Institutions with SEB of							
Less than $3,000	4.9	100	41	8	21	30	**
$3,000 - $4,999	365.7	100	22	23	15	13	27
$5,000 - $7,499	521.0	100	14	16	35	20	15
$7,500 - $9,999	643.1	100	17	17	34	22	9
$10,000 - $12,499	359.7	100	17	11	45	18	9
$12,500 or over	433.6	100	3	1	84	9	3

* In millions of dollars.
** Less than $50,000.

Table 11--Fall 1984 Enrollment Status

	Percentage of Institutions Reporting-			Total	
	More Students than Planned	Fewer Students than Planned	Enroll-ment as Planned	Percent	No.
All institutions	**14%**	**45%**	**41%**	**100%**	**2,650**
Control and Type of Institution					
All public institutions	11	53	37	100	1,455
Research universities	33	18	49	100	104
Comprehensive universities	14	44	43	100	282
Baccalaureate colleges	11	44	44	100	127
Two-year colleges	7	60	33	100	942
All independent institutions	19	36	45	100	1,195
Research universities	27	9	64	100	58
Comprehensive universities	52	13	35	100	157
Baccalaureate colleges	15	38	47	100	612
Two-year colleges	11	46	43	100	368
Student Expense Budget (SEB)					
Institutions with SEB of					
Less than $3,000	0	40	60	100	121
$3,000 - $4,999	10	55	35	100	1,074
$5,000 - $7,499	13	49	38	100	587
$7,500 - $9,999	18	37	45	100	617
$10,000 - $12,499	21	18	61	100	171
$12,500 or over	67	5	28	100	80

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

December 31, 1984

Dear Student Financial Aid Officer:

The Department of Education has asked the American Council on Education's Higher Education Panel (HEP) to conduct the attached Survey Number 68, "Student Financial Aid to Full-time Undergraduates, Fall 1984." The survey has been designed with special attention directed to funding, the composition of "typical" student aid packages, and the role of special tuition payment programs and student employment in providing financial assistance to undergraduates. We are asking you to assist us by completing the questionnaire.

As you know, the Higher Education Act is due to be reauthorized during the current session of Congress. Current data are needed to evaluate the recent changes in federal aid programs and to help in developing new proposals.

We know that you are especially busy now, but we hope you can find time to help us with this important survey. We realize that precise data for several of the questions are not yet available for the current academic year. We ask, therefore, that you provide your best estimates in those instances where exact figures are not at hand.

Please understand that your institution's response will be protected to the maximum extent permissible by law. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identifiable with your institution. This survey is authorized by the National Science Foundation Act of 1950, as amended. Although you are not required to respond, your cooperation is needed to make the results comprehensive, reliable, and timely.

Please complete the questionnaire and return it to us by February 4, 1985 in the enclosed prepaid reply envelope. If you have any problems or questions concerning the survey, please do not hesitate to telephone us collect at (202)833-4757.

Thank you for your assistance.

Sincerely,

Frank J. Atelsek

Frank J. Atelsek
Panel Director

Enclosures

One Dupont Circle, Washington, D.C. 20036-1193 (202) 833-4757

OMB #3145-0009
Exp. 03/31/87

AMERICAN
COUNCIL ON
EDUCATION

Higher Education Panel Survey No. 68

Student Financial Aid to Full-time Undergraduates, Fall 1984

DEFINITIONS

1. **Student financial aid.** For questions 1-5, student financial aid is meant to include all forms of student financial assistance **except** social security benefits, veterans benefits, and Guaranteed Student Loans (GSLs). Be sure to include all scholarships and grants (including Pell Grants, remission of tuition and fees), institutionally arranged student employment (including college work-study programs) and loans, **with the exception of** the GSLs as noted above.

2. **Dependent/independent.** Student's status regarding dependency on parents for financial support, according to the definition your institution uses for federal student aid purposes.

3. **Student aid package--total student resources (question 6).** All the resources that a typical aided student has to meet a year's college costs. This includes the funds arranged for by the institution (scholarships/grants, employment, loans including GSLs) plus the expected contribution from the student and the student's family.

4. **Full-time undergraduate.** Any student defined by the institution as a full-time undergraduate during the traditional fall 1984 term.

1a. What was your fall 1984 **full-time undergraduate student** enrollment? __________

b. What proportion of these students in fall 1984, received some form of student financial aid from programs that use your institution as the delivery agent? See definition 1 above, for types of aid to be included. **Note: Do NOT include students who have only GSLs.**

________%

2. Please estimate the total dollar amount of financial aid provided to your full-time undergraduate students through programs that use your institution as the delivery agent. See definition 1 for programs to be included. Estimate for the entire 1984-85 academic year. **Note: Do NOT include GSL funds.**

1983-84 $______________ 1984-85 $______________

3. Of the amounts shown in question 2, what percentage was funded by federal student aid programs?

1983-84 _______% 1984-85 _______%

4. What percentage of your full-time undergraduate students **who receive federal aid** are classified as "independent" students?

_______%

5. Please characterize your institution's fall 1984 full-time undergraduate student aid recipients by their family income level. To determine dependency status, use the definition your institution uses for **federal** student aid purposes.

Total Family Income	Percentage of Full-time **Dependent** Undergraduates	Percentage of Full-time **Independent** Undergraduates
a. $0-5,999	_____%	_____%
b. $6,000-$14,999	_____%	_____%
c. $15,000-$29,999	_____%	_____%
d. $30,000 or more	_____%	_____%
Total	100%	100%

6. **Student Aid Packages--Total Student Resources.** To the extent that there are **"typical single freshman and senior student financial aid packages"** at your institution for the classifications shown below, indicate the proportion of each "package" that comes from each of the sources listed on lines 6a through 6d. Make sure that the percentages total 100 percent. **Note that we ask you to indicate the percentage contributed by the student and the student's family (line 6d).**

	Single, Full-time, Dependent, Resident Student from			
	Low-income Family ($10,000-$15,000)		Middle-income Family ($25,000-$35,000)	
Source	Freshman	Senior*	Freshman	Senior*
a. Grants and scholarships	____%	____%	____%	____%
b. Student employment	____%	____%	____%	____%
c. Student loans (include NDSLs and GSLs)	____%	____%	____%	____%
d. Other sources (student's savings, summer earnings, etc.; contributions of the student's family; parental loans, etc.)	____%	____%	____%	____%
Total	100%	100%	100%	100%

*At 2-year institutions, second year students

7. **Student Expense Budget.** Please indicate the average annual student expense budget for each student classification shown in question 6. Include tuition and fees, room and board, transportation, books and supplies, and other expenses. Public institutions should show only the expense budgets for **in-state** students. $_____ $_____ $_____ $_____

8. **Cumulative Debt.** For the typical undergraduate student who uses loans(including GSLs), please estimate the average **cumulative** student debt upon graduation for each type of student.

Low-income Single Dependent Student	Middle-income Single Dependent Student
$____________	$____________

9. **Tuition Payment Programs.** Some institutions are offering students and families alternative ways of paying for college costs. Many stretch out payments over an academic year; some freeze the student's four-year tuition at the current level in return for a lump-sum payment of the four years' tuition; some offer parents loans for such lump-sum payments and provide long-term repayment options. Some colleges have "earn-as-you-go" or cooperative education programs that let students alternate between full-time study and full-time employment.

On the blanks below, please indicate what percent of your full-time undergraduates are using each of these alternatives.

Tuition Payment Programs	Percent of Full-time Undergraduate Students
a. Academic year installment plan	______%
b. Lump-sum prepaid tuition for 4 or 2 years, in return for freezing the tuition at the current level	______%
c. Loan to cover the lump-sum prepaid tuition plan (with repayment extending beyond graduation)	______%
d. Special programs that involve students in work periods alternating with study. (The most common is the "cooperative education" plan.) Do **NOT** include the conventional federal, state, or institutional "work-study" program(s).	______%
e. Other; specify. ________________________	______%

10. Indicate the source (in percentages) of the funds used to pay undergraduate students in your institutionally administered "work-study program(s)." Count state and institutional "matching funds" for government-sponsored "work-study" programs on the state and institutional lines, respectively.

Source	
Federal	____%
State	____%
Institutional	____%
Other	____%
Total	100%

11. In developing your aid packages, how much do you **expect** a typical single, dependent, full-time undergraduate student to earn from all sources--including summer earnings and work-study--to meet the cost of education during the year?

Freshman: $__________ total dollars earned

__________ percent of cost covered by earnings

Senior: $__________ total dollars earned

__________ percent of cost covered by earnings

12. Please **estimate** the amount of student financial aid for the current year that is **funded by your institution** and awarded according to the criteria listed below. Exclude financial aid that comes from outside sources such as National Merit Scholarships and/or government programs such as Pell Grants, SEOG, NDSL, federal or state College Work-Study, etc.

Criteria by Which Aid Is Distributed	Amount of Institutionally Funded Aid
a. A student's academic or artistic **merit only**	$__________
b. A student's **athletic ability only**	$__________
c. A student's **need only**	$__________
d. A **combination** of a student's academic or artistic **merit and need**, i.e., selection based on merit and amount of award based on need.	$__________
e. Other	$__________
Total **institutionally funded** student aid	$__________

13. Did your institution enroll more or fewer full-time undergraduate students last fall (1984) than you had planned?

___ More. How many more? ________

___ Fewer. How many fewer? ________

___ Enrollment was as planned.

Thank you for your assistance. Please return this form by **February 4, 1985** to

Higher Education Panel
American Council on Education
One Dupont Circle Suite 829
Washington, DC 20036

Please keep a copy of this form for your records.
Person completing the form:

Name ______________________

Title ______________________

Telephone (   ) ______________________

APPENDIX B: TECHNICAL NOTES

The survey instrument was sent to all 465 Panel colleges and universities in half-sample 1 that were deemed to have undergraduate programs. Excluded were independent schools of medicine, health sciences, theology, business, law, education and small institutions specializing in religious studies, the arts, and technology, and other institutions that offered only post-baccalaureate study. Responses were received from 350 institutions, for an overall response rate of 75 percent. Table B-1 shows the population and responses by stratum.

Table B-1--Stratification Design

Cell	Type of Institution	Population	Respondents
	Total	2,650	350
	Certainty Domain		
1	Public university	104	39
2	Private university	58	21
3,5	Public comprehensive	96	42
4,6	Private comprehensive	31	11
7	Public 2-year	43	14
	Probability Domain		
8,9,14	Public comprehensive	185	30
10	Private comprehensive	126	20
11	Public baccalaureate	127	18
12,13	Private baccalaureate	612	51
17-20	Public 2-year academic/ comprehensive	616	63
21	Private 2-year academic/ comprehensive	129	10
22,23	Public 2-year occupational	284	22
24	Private 2-year occupational	239	9

Weighting

Data from the 350 responding institutions were statistically adjusted to represent the population of institutions with undergraduate programs. The weighting technique used was the standard one employed for Panel surveys. Data received from Panel members were adjusted for item and institutional nonresponse within each cell. Then institutional weights were applied to bring Panel data up to estimates representative of the national population.

However, for a number of questions that requested percentages rather than actual counts, prior to the assignment of institutional weights, it was necessary to convert them into counts, either of dollars or of students, before they could be institutionally weighted and aggregated for national and sectoral totals. Questions 1b-7, 9 and 11 were given this additional weighting by undergraduate enrollment.

For question 4 (distribution of families by income level), the percentage provided by the institution was converted into a student count by using data from question 1a and the dependent/independent proportion from question 4 (percentage of federally assisted students deemed independent).

For question 6 (composition of student aid packages) estimates of enrollment by income level were based in part on data from the ACE-UCLA Cooperative Institutional Research Program, and estimates for enrollment by class level were based on data from the National Center for Education Statistics and the Census Bureau.

Comparison of Respondents and Nonrespondents. Table B-2 compares the survey respondents and nonrespondents against several variables. Higher than average response rates were recorded for baccalaureate colleges and institutions with one to five thousand full-time-equivalent (FTE) enrollments. Two-year colleges and institutions with FTE enrollments of less than 1,000 had response rates that were lower than average.

Table B-2--Comparison of Respondents and Nonrespondents

(In percentages)

Institutional Characteristics	Respondents (N=350)	Nonrespondents (N=115)	Response Rate
Total	100.0	100.0	75.3
Control			
Public	65.1	70.4	73.8
Independent	34.9	29.6	78.2
Type			
Universities	17.1	18.3	74.0
Comprehensive	29.4	24.3	78.6
Baccalaureate	19.7	14.8	80.2
Two-year	33.8	42.6	70.7
Region			
East	22.6	26.1	72.5
Midwest	24.3	27.0	73.3
South	33.1	28.6	77.9
West	20.0	18.3	76.9
Full-time-equivalent undergraduate enrollment (1982)			
Less than 1,000	16.6	23.5	68.2
1,000 - 4,999	41.6	33.1	79.3
5,000 - 9,999	20.9	24.3	72.3
10,000 or more	20.9	19.1	76.8

Reliability of Survey Estimates. Because the statistics presented in this report are based on a sample, they will differ somewhat from the figures which would have been obtained if a complete census had been taken using the same survey instrument, instructions, and procedures. As in any survey, the results are also subject to reporting and processing errors and errors due to nonresponse. To the extent possible, these types of errors were kept to a minimum by methods built into the survey procedures.

The standard error is primarily a measure of sampling variability--that is, the variations that might occur by chance because only a sample of the institutions is surveyed. The chances are about 90 out of 100 that it would be less than 1.65 times the standard error; about 95 out of 100 that it would be less than 1.96 times the standard error; and about 99 out of 100 that it would be less than 2.5 times as large. Thus, knowing the standard error permits us to specify a range within which we can have a stated confidence that a given estimate would lie if a complete census, rather than a sample survey, had been conducted.

In this survey, a question that lends itself to this type of analysis is question 2, the undergraduate full-time enrollment in Fall 1984. As table B-3 shows, the 90 percent confidence interval is plus or minus 318,100. Thus, chances are about 90 out of 100 that a complete census would show the Fall 1984 full-time undergraduate enrollment to be more than 6,747,100 and less than 7,383,300.

Table B-3--Ninety Percent Confidence Intervals for Selected Survey Estimates

Item	Estimate	Confidence Interval (+ or -)
Full-time undergraduate enrollment	7,065,200	318,100
Total student aid (in millions)		
Academic year 1983-84	$6,934.8	$403.8
Academic year 1984-85	7,436.8	427.3
Institutionally funded student aid (in millions)	$2,328.1	$292.9

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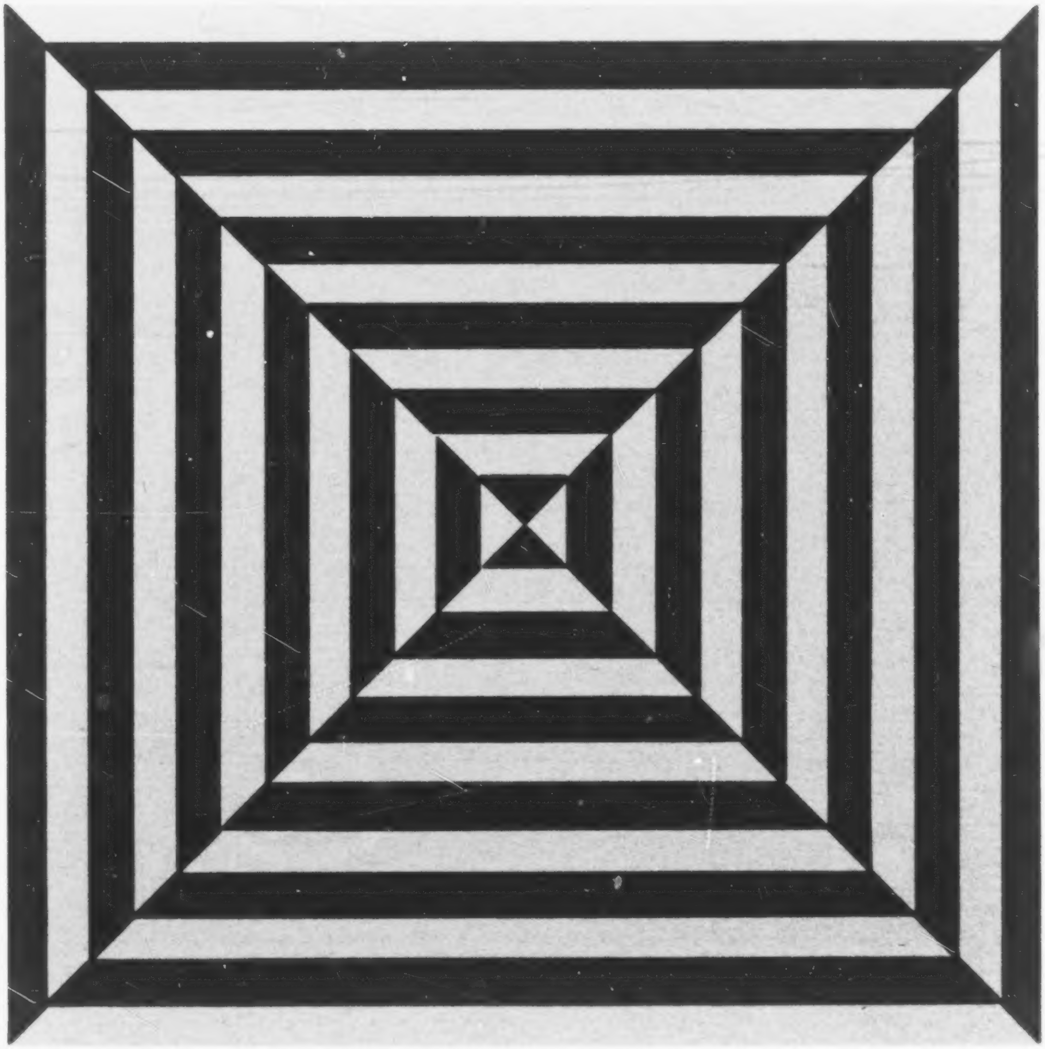
ACCESS TO SUPERCOMPUTERS

Engin Inel Holmstrom



HIGHER EDUCATION PANEL REPORT NUMBER 69
AMERICAN COUNCIL ON EDUCATION

JANUARY
1986

A Survey Funded by the National Science Foundation, the U.S. Department of Education,
and the National Endowment for the Humanities

AMERICAN COUNCIL ON EDUCATION

Robert H. Atwell, President

The American Council on Education, founded in 1918, is a council of educational organizations and institutions. Its purpose is to advance education and educational methods through comprehensive voluntary and cooperative action on the part of American educational associations, organizations, and institutions.

The Higher Education Panel is a survey research program established by the Council for the purpose of securing policy-related information quickly from representative samples of colleges and universities. *Higher Education Panel Reports* are designed to expedite communication of the Panel's survey findings to policy-makers in government, in the associations, and in educational institutions across the nation.

The Higher Education Panel's surveys on behalf of the Federal Government are conducted under support provided jointly by the National Science Foundation, The National Endowment for the Humanities, and the U.S. Department of Education (NSF Contract SRS-8117037).

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ACCESS TO SUPERCOMPUTERS

Engin Inel Holmstrom

Higher Education Panel Reports
Number 69 January 1986

American Council on Education
Washington, D.C. 20036

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This study was sponsored by the National Science Foundation (NSF) and is the last in the series of federally-supported surveys conducted by the Higher Education Panel since 1971. We are grateful to the National Science Foundation, National Institutes of Health, National Endowment for the Humanities, and the U.S. Department of Education for their support of the Panel studies over the past fourteen years. Our thanks go to the staff of the above-mentioned federal agencies, the Federal Advisory Board, and its Technical Advisory Committee for their advice and contributions over the years.

We are grateful to Mary Golladay and Christina Wise of NSF for their contributions to the present study and to the American Council on Education's Higher Education Panel's Advisory Committee for their guidance and suggestions. As usual, we offer special recognition and thanks to each campus representative and departmental respondent for their cooperation and timely response to the study.

Finally, we wish to acknowledge that the early stages of this study were conducted under the guidance of Frank J. Atelsek, the Higher Education Panel's Director, until his untimely death in May 1985.

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HIGHLIGHTS

Over 80 percent of the 1,190 departments surveyed in 10 selected fields (that is, electrical, mechanical, and metallurgical/materials engineering; atmospheric and geosciences; cell biology; mathematics/applied mathematics; chemistry; physics; and economics) reported limited access to supercomputers.

The most frequent use of supercomputers was in atmospheric sciences where a majority of departments had ready access to supercomputers. Over 20 percent of researchers in atmospheric sciences currently use, or have used, supercomputers in their lines of research.

The use of supercomputers in most other fields is limited to about 1 in 20 faculty and professional research staff.

In general, departments at institutions ranked in the top 50 according to research and development expenditures had more ready access to supercomputers (25 percent) than departments at other institutions (14 percent).

The limited capacity and speed of conventional main frame computers is constraining the research activity of about one-eighth of the faculty and research staff in the disciplines and universities surveyed.

The sequential processing design of conventional computers, as opposed to the parallel processing capabilities of supercomputers, is constraining the research activity of about one-tenth of the faculty and research staff.

In general, access to time on supercomputers was the first-ranked type of assistance needed to increase their use. The other types of assistance often ranked first were (a) opportunities to gain knowledge about the technical capabilities of supercomputers and (b) access through telecommunication links to remote centers with supercomputers.

BACKGROUND

A lot of attention has been paid by the media recently to the fact that the use of microcomputers has become relatively widespread at the nation's colleges and universities. A less publicized fact is that a vast majority of researchers at academic institutions have no access to advanced large scale computers, or "supercomputers" as they are referred to in the popular media. Supercomputers such as **Cray-1**, first introduced in 1977, and **Cyber 205**, introduced in 1981, perform at least 100 million floating point operations per second and are recognized as one of the most important research, development, and design tools of the late 20th century.[1]

Supercomputers offer the potential for advances in research activity in a wide range of fields and permit researchers to pursue lines of inquiry not feasible with conventional main frame machines such as those in the IBM-308x series, VAX-7XX series, or CDC-7600. Supercomputers have already revolutionized various industries, including the petroleum industry, the aircraft industry, the automotive industry, the electronics industry, the electric-power industry, and the movie industry. Many argue that the lack of access to supercomputers for most researchers on American universities is going to have serious long-term consequences for the nation, and that without supercomputers, American basic research and engineering science will fall behind that of other countries which are pursuing aggressive national policies regarding the availability and use of supercomputers.[2]

The National Science Foundation (NSF) has been concerned with the problem of inadequate access to supercomputers for university researchers, and in 1983 issued a planning report entitled "A National Computing Environment for Academic Research," known as the Bardon report. The report outlined a tentative two-step plan to increase access to supercomputers. However, the Foundation had only limited information on which to decide relative priorities for action.[3]

Because supercomputers cost considerably more than conventional main frame machines, it is unlikely that in the near future most large universities can expect to acquire supercomputers for use on their campuses. Shared facilities and networks appear to be more viable options. Further, supercomputers are fundamentally different from conventional computers and require different conceptualization and presentation of problems. To increase the research applications of supercomputers, information is needed on the need and mechanisms for supplying machine time, information-networks, and technical support.

This study was sponsored by NSF to provide the Foundation with benchmark information on current computer use in the nation's major research universities, including the actual and potential use of supercomputers. The survey was conducted by the Higher Education Panel of the American Council on Education (ACE). (See Appendix B: Methods Summary for technical details.)

The survey universe was designed to include all major research universities that award five or more doctoral degrees and have a doctorate-granting department in at least one of the following fields: electrical engineering, mechanical engineering, metallurgical/materials engineering, atmospheric sciences, geosciences, cell biology, mathematics and applied mathematics (computer science), chemistry, physics, and economics.

Questionnaires were mailed in mid-April 1985 to 207 doctorate-granting Panel members. Twenty-three reported that they did not meet the survey criteria; this reduced to 184 the number of institutions from which substantive responses could be expected.[4] After followups, 167 institutions (91 percent) responded with at least one departmental questionnaire completed. The survey responses were weighted using non-response adjustment weights to calculate national estimates. Based on these weighted responses, the study describes computer-use practices of about 33,500 faculty and professional research staff employed in about 1,190 departments located in 185 doctorate-granting universities in the nation (see table B-3 in Appendix B). Faculty who were away from campus on sabbatical in spring of 1985 and graduate students participating in research projects, whether salaried or on other support, were not included in the study.

Findings are presented by departments, by control of institutions, and by top 50 status of institutions in terms of research and development (R&D) expenditures during 1980-83. Two-thirds of the departments were in public and one-third in private institutions. Just over 70 percent of the faculty and research staff were in public institutions. About one-third of the programs were housed in the top 50 institutions, which employed 45 percent of the faculty and research staff.

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1. Gene Dallaire, "American Universities Need Greater Access to Supercomputers." Communications of the ACM, April 1984, Vol.27, No.4, 292-298.

2. Ibid.

3. "Access to Supercomputers: An NSF Perspective, An Interview with Edward F. Hayes," Communications of the ACM, April 1984, Vol. 27, No. 4, 299-303.

4. National Center for Education Statistics' data and other listings indicate that 185 institutions (only one not a member of the Panel) met the study eligibility criteria.

FINDINGS

The findings are presented in two major sections. First, current use of computers and scientific work stations, applicability of supercomputers to present lines of research, and the type of assistance needed to increase university researchers' access to supercomputers are discussed in general terms. Then departmental summaries are presented.

General Findings

Present Use of Computers

Respondents were asked to indicate how many of their full-time faculty and research staff were (a) currently using or have used supercomputers, (b) were formulating plans for research requiring supercomputers, or taking concrete steps to pursue an interest in them, (c) now using conventional main frame computers as an integral part of their research, and (d) now making no use of conventional main frame computers. They were asked to account for each person only once in the list and treat the list as hierarchical. Therefore, the number of faculty reported below as making use of conventional main frame computers may be an underestimate insofar as some of the faculty and research staff using or making plans to use supercomputers may also be using conventional main frame machines in their current lines of research.

Currently only about 1 in 20 faculty and professional research staff in the selected fields surveyed use, or have used, supercomputers in their research. Another 1 in 20 appear to be formulating plans for research which will require the use of supercomputers. Thus, when these plans materialize, about 1 in 10 university researchers may be making use of supercomputers in their lines of research. In addition, over 4 in 10 faculty and professional staff use conventional main frame computers, such as IBM, VAX or CDC-7600. Another 4 in 10 are currently making no use of conventional main frame machines.

Combining users of both supercomputers and conventional main frame computers, it appears that just over half the faculty and professional research staff at doctoral departments in ten selected fields use computers in their lines of research, and the utilization patterns are surprisingly similar across faculty employed in public (55 percent) or private (56 percent) universities (see figure 1). However, those employed in the top 50 institutions are slightly more likely to use computers (58 percent) than are faculty employed in other institutions (53 percent) (see figure 2).

Although institutional characteristics (that is, control and top 50 status) do not appear to be strongly related to the pattern of computer use of university researchers, there are substantial departmental differences (see figure 3). The heaviest total computer use is in atmospheric sciences where 78 percent of the faculty and professional research staff use computers, followed by electrical engineering (73 percent), mechanical engineering (72 percent, and physics (67 percent). The least use of computers is in departments of mathematics/applied mathematics and cell biology (each 39 percent).

The heaviest use of supercomputers is among the faculty and professional research staff employed in departments of atmospheric sciences, where over 2 in 10 use supercomputers in their lines of research. Further, if the current research plans of about 10 percent of the faculty in such departments materialize, then over 3 in 10 atmospheric sciences faculty and professional staff would be using supercomputers regularly in their lines of research.

Similarly, if current research plans of faculty in mechanical engineering and physics materialize, in each field nearly 2 in 10 faculty would be using supercomputers in their lines of research. In other fields, the actual and potential use of supercomputers varies from over 1 in 10 faculty (electrical engineering, metallurgical and materials engineering, geosciences) to about 3 percent of faculty in economics.

Current use of supercomputers is, of course, dependent on the degree with which supercomputers are accessible to faculty and research staff in each field. Over 80 percent of faculty and research

Figure 1 - Computer Use by Faculty/Research Staff at Doctoral Departments, by Control of Institution

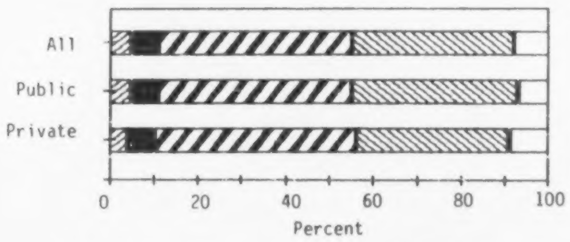


Figure 2 - Computer Use by Faculty/Research Staff at Doctoral Departments, by Top 50 (R&D) Status

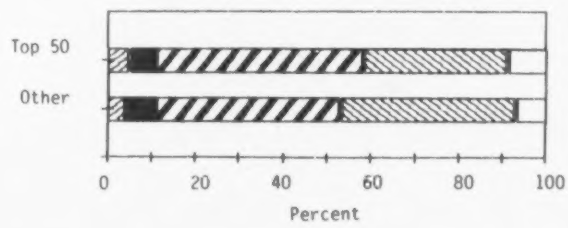


Figure 3 - Level of Computer Use by Total Faculty/Research Staff at Doctoral Departments

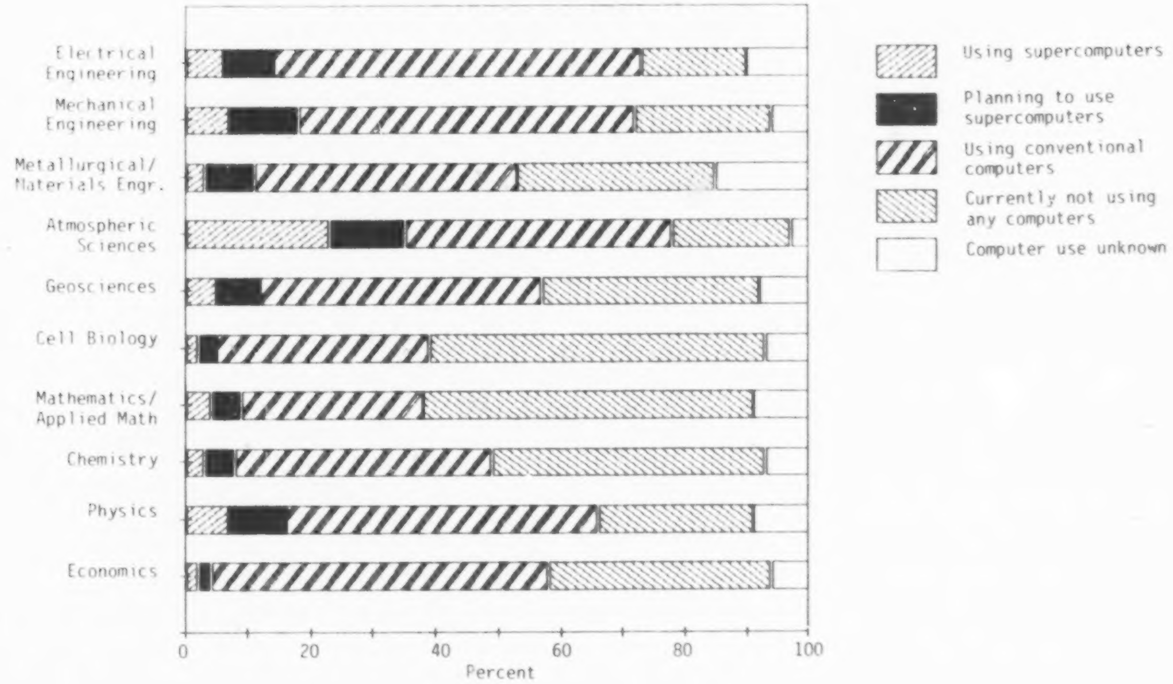
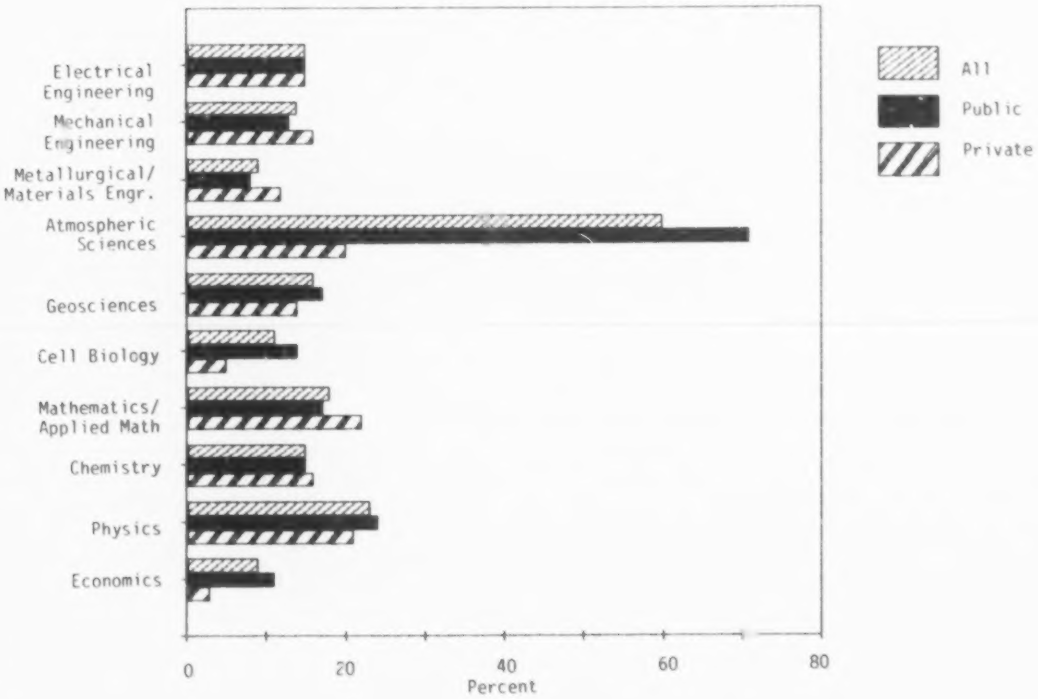


Figure 4 - Proportion of Doctoral Departments with Ready Access to Supercomputers, by Control of Institution



staff seem to have only limited access to supercomputers. Not surprisingly, 60 percent of departments of atmospheric sciences, where supercomputer use is most frequent, reported that their faculty and professional research staff have ready access to supercomputers (see figure 4). In contrast, the proportion of remaining departments with ready access to supercomputers varied from a high of 23 percent (physics) to a low of 9 percent (metallurgical/materials engineering and economics).

In general, departments in public and private institutions seem to provide similar rates of ready access to supercomputers. The only exception is in atmospheric sciences where 71 percent of departments located in public but only 20 percent of those located in private institutions had ready access to supercomputers. Finally, supercomputers are more readily accessible in departments located in the top 50 institutions than those located in other institutions (see figure 5).

One-fifth (22 percent) of the departments with limited access to supercomputers stated that gaining ready access to the machines was a matter of high priority. Opinion varied by discipline, however. Figure 6 shows that nearly half of the atmospheric sciences departments that had limited access and over one-third of such mechanical engineering and physics departments gave high priority to gaining ready access to supercomputers. However, only 5 percent of the economics departments and 6 percent of the cell biology departments that had only limited access gave gaining ready access a high priority.

Use of Scientific Work Stations

For the purposes of this study, scientific work stations were defined as 32-bit machines with memory of at least one megabyte; screen resolution on the order of 800x1,000 in order to adequately display a full range of graphics, and the ability to work in an integrated network environment with UNIX-like operating system and a Fortran compiler. Excluded were personal computers used as word processors and word processors with business graphics capabilities.

The use of scientific work stations ranged from one-fourth of faculty in departments of electrical engineering, atmospheric sciences, and geosciences to about 10 percent of faculty in departments of cell biology, mathematics/applied mathematics, and chemistry (see detailed table 6).

There was no consistent difference in the use of scientific work stations by faculty and research staff employed in public and private institutions. In metallurgical/materials engineering and atmospheric sciences, more of the faculty and research staff in public than in private institutions used scientific work stations while the reverse was true for those in chemistry and mathematics/applied mathematics. Surprisingly, faculty and research staff employed in the top 50 institutions were somewhat less likely to use scientific work stations than were faculty employed in other insti-

Figure 5 - Proportion of Doctoral Departments with Ready Access to Supercomputers, by Top 50 (R&D) Status of Institution

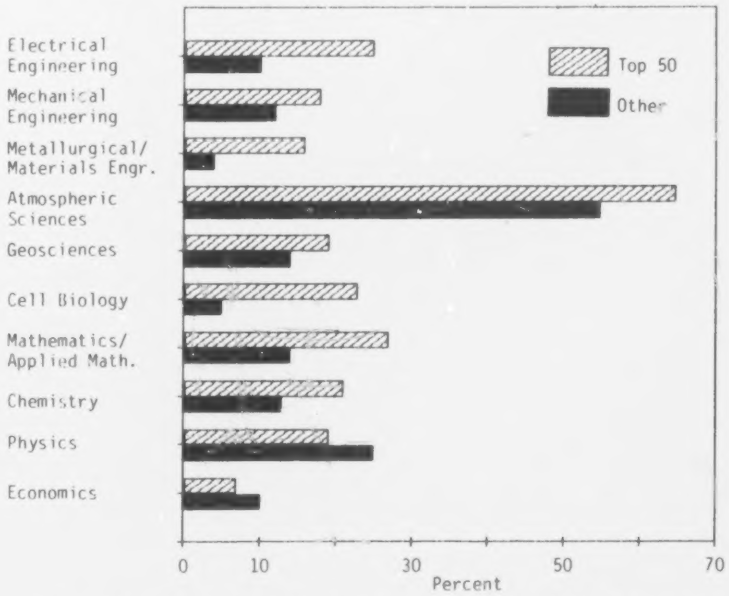
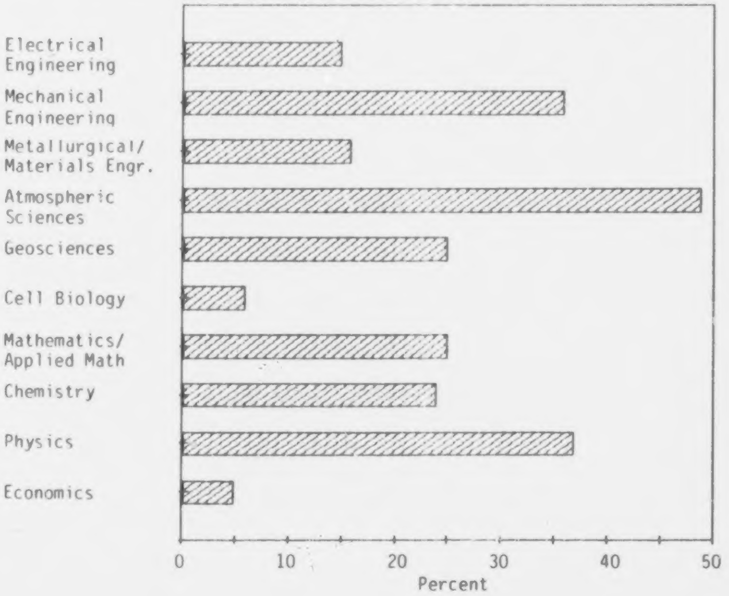


Figure 6 - Proportion of Doctoral Departments with Limited Access to Supercomputers That Place a High Priority on Gaining Access



tutions (see detailed table 5.2). Finally, faculty and research staff in departments with ready access to supercomputers were more likely to use scientific work stations than faculty in departments with limited access to supercomputers (see figure 7).

Figure 7 - Percentage of Faculty/Research Staff Using Scientific Work Stations at Doctoral Departments, by Access to Supercomputers

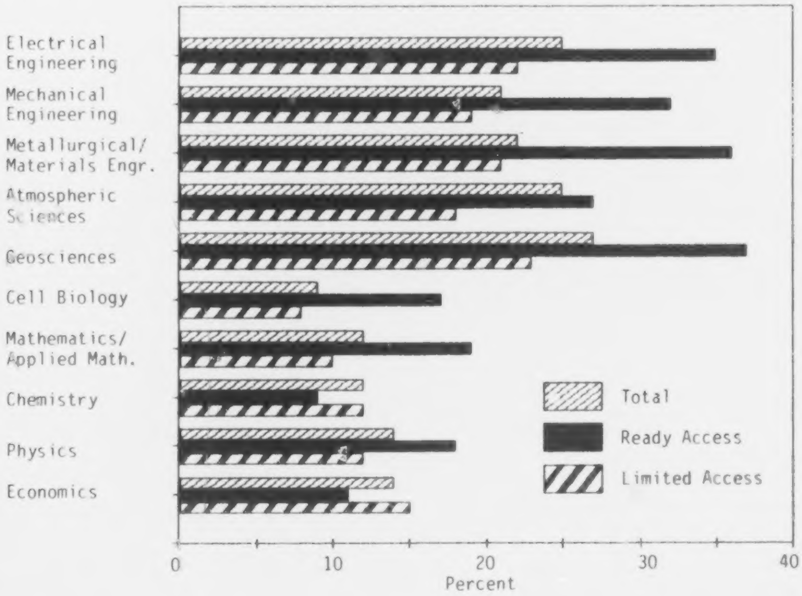
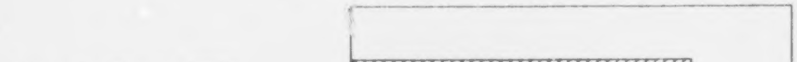


Figure 8 - Types of Assistance Needed to Increase Use of Supercomputers



Applicability of Supercomputers to Research

Respondents were asked to indicate how many of the faculty and professional research personnel in their departments were pursuing lines of research that could benefit from access to supercomputers. The proportion of faculty and research personnel "whose work is now constrained by the capacity or speed of conventional main frame computers" ranged from a high of 20 percent (atmospheric sciences) to a low of 5 percent (cell biology) (see detailed table 4). Finally, the proportion of faculty "whose work is now constrained by the sequential processing design of main frame computers, as opposed to the parallel processing capabilities of advanced large-scale computers" ranged from a high of 13 percent (electrical engineering and mechanical engineering) to a low of 3 percent (economics).

Need for Assistance

Types of assistance needed to increase supercomputer use varied by field. The most frequently ranked first type of assistance was having "access to time on supercomputers, disregarding funding constraints" which 3 in 10 departmental respondents said would have the greatest immediate impact on increasing the use of supercomputers by their faculty and professional research staff (see figure 8). Another 2 in 10 agreed that "opportunities to gain knowledge of technical capabilities of supercomputers" would be most helpful in increasing supercomputer use. The least likely type of assistance to be ranked first was help with software and programming which only 7 percent said would increase supercomputer use in their departments.

Rankings of types of assistance needed were relatively consistent across programs in public and private institutions as well as those in the top 50 and other institutions (see detailed table 8). However, there were some departmental differences. Having access to supercomputers without funding constraints was ranked first by nearly half the departments of physics but by only 6 percent of departments of cell biology (see detailed table 9). In cell biology where supercomputer use is very infrequent, assistance was most often needed in terms of introduction and orientation to supercomputers.

Departmental Summaries

Electrical Engineering: Only 6 percent of the faculty and professional research staff in departments of electrical engineering were currently using, or have used, supercomputers. Another 8 percent had made plans to use supercomputers. Fully 6 in 10 faculty were using conventional main frame computers. Research activities of about 14 percent of faculty were said to be constrained by use of conventional computers. About one-fourth of faculty were regularly using scientific work stations to support their professional research. Finally, one-fourth of the departments of electrical engineering stated that assistance in gaining access to time on supercomputers, disregarding funding constraints as well as having access to scientific work stations and graphics capabilities to interface with supercomputers would greatly increase the use of supercomputers by their faculty and professional research staff.

Mechanical Engineering: About 7 percent of faculty and research staff in departments of mechanical engineering were currently using, or have used, supercomputers and another 11 percent had plans to use them. Over half (55 percent) were currently using conventional main-frame computers. Research activities of 19 percent of the faculty were said to be constrained by the use of conventional computers. Just over 2 in 10 faculty were regularly using scientific work stations. Over 4 in 10 departments agreed that having access to time on supercomputers, disregarding financial constraints would have the greatest immediate impact on increasing supercomputer use of their faculty. Another 2 in 10 agreed that having opportunities to gain knowledge of technical capabilities of supercomputers would also help.

Metallurgical and Materials Engineering: Only 3 percent of the faculty and research staff in such departments were currently using, or have used, supercomputers; another 8 percent had made plans to use them. Just over 4 in 10 faculty were using conventional main-frame computers. Research activities of about 10 percent of faculty were said to be constrained by the use of conventional computers. About 2 in 10 faculty were regularly using scientific work stations. Over 3 in 10 departments agreed that assistance in gaining access to time on supercomputers, disregarding funding constraints, would greatly increase faculty members' use of supercomputers, while about 2 in 10 agreed that having opportunities to gain knowledge of the technical capabilities of supercomputers would be most helpful.

Atmospheric Sciences: The most frequent use of supercomputers was in atmospheric sciences where 23 percent of the faculty and professional research staff were currently using, or had used, supercomputers, and another 12 percent had made plans to use them. In addition, over 4 in 10 faculty were using conventional main frame computers. The research activities of about 2 in 10 faculty were said to be constrained by the use of conventional computers. Just over 2 in 10 were regularly using scientific work stations in their current lines of research. Types of assistance ranked first in terms of having the greatest impact on increasing the use of supercomputers included access to time on supercomputers, regardless of funding constraints (35 percent), access to telecommunications links to remote centers with supercomputers (19 percent), access to work stations and graphics capabilities to interface with supercomputers (19 percent), and support for software and programming (17 percent).

Geosciences: About 5 percent of the faculty and research staff were currently using, or had used, supercomputers; another 7 percent had plans to use them. In addition, 45 percent were currently using conventional main-frame computers. The research activities of about 11 percent of the faculty were said to be constrained by the use of conventional computers. Over one-fourth of the faculty were regularly using scientific work stations in their current lines of research. Types of assistance needed to increase faculty use of supercomputers included having access to time on supercomputers, regardless of funding constraints (23 percent), access through telecommunications links to remote centers with supercomputers (19 percent), and access to scientific work stations with graphics capabilities to interface with supercomputers (19 percent).

Cell Biology: Only 2 percent of faculty and professional research staff in departments of cell biology were currently using, or had used, supercomputers, and another 3 percent had plans to use them. Over 3 in 10 faculty were currently using conventional main-frame computers. The research activities of only about 5 percent of faculty were said to be constrained by the use of conventional computers. Fewer than 1 in 10 faculty had access to scientific work stations. In cell biology where supercomputer use was very infrequent, having access to time on supercomputers without funding constraints was ranked first by only 6 percent of departments. Instead, 28 percent of the departments stated that having opportunities to gain knowledge of the technical capabilities of supercomputers would be most influential in increasing their use, 20 percent agreed that opportunities to see the results of uses of supercomputers to solve a variety of problems (for example, attending special workshops and seminars) would greatly increase use, and 17 percent stated that having opportunities to interact with researchers skilled at conceptualizing problems for supercomputers would help.

Mathematics/Applied Mathematics: Only 4 percent of faculty were currently using, or had used, supercomputers and another 5 percent had plans to use them. Nearly 3 in 10 were using conventional main-frame computers. Research activities of fewer than 1 in 10 faculty were said to be constrained by the use of conventional computers. Just over 1 in 10 were regularly using scientific work stations. In terms of assistance needed, over 3 in 10 departments ranked first access to time on supercomputers, regardless of funding constraints, and nearly 2 in 10 ranked first access to scientific work stations with graphics capabilities to interface with supercomputers as the most effective way of increasing supercomputer use in their departments.

Chemistry. Only 3 percent of the faculty and professional research staff at the departments of chemistry were currently using, or had used, supercomputers; another 5 percent had plans to use them. Just over 4 in 10 faculty were currently using conventional main frame computers. Research activities of about 1 in 10 were said to be constrained by the use of conventional computers. Over 1 in 10 were regularly using scientific work stations. About 4 in 10 departments agreed that having access to time on supercomputers, disregarding funding constraints, would increase the use of supercomputers among their faculty, while just under 2 in 10 agreed that having access to telecommunications telecommunications links to remote centers with supercomputers would be most helpful.

Physics. About 7 percent of the faculty and research staff were currently using, or had used, supercomputers, and another 9 percent had plans to use them. In addition, fully half the faculty were using conventional main frame computers. Research activities of nearly 2 in 10 faculty were said to be constrained by the use of conventional computers. About 14 percent were regularly using scientific work stations. Among types of assistance ranked first in terms of having the greatest and immediate impact on faculty use of supercomputers were access to supercomputers without funding constraints (48 percent) and access to telecommunications linkages to remote centers with supercomputers (21 percent).

Economics. Very few faculty at departments of economics were currently using, or had used, supercomputers (2 percent) or had plans to use them (2 percent). Over half (55 percent) were using conventional main frame computers. Research activities of about 7 percent of the faculty were said to be constrained by the use of conventional computers. About 14 percent were regularly using scientific research stations in their current lines of research. Among first ranked types of assistance needed in having the greatest and immediate impact on use of supercomputers were having access to knowledge of the technical capabilities of supercomputers (34 percent) and access to time on supercomputers without any funding constraints (19 percent).

SUMMARY

Over 80 percent of the 1,190 surveyed departments in 10 selected disciplines reported limited access to supercomputers. Only in atmospheric sciences did a majority of departments have ready access to supercomputers. In that field, 20 percent of the faculty and professional research staff are currently using, or have used, supercomputers and another 12 percent are planning to use them in their research. In the remaining fields, supercomputer use is limited to a few faculty and researchers.

In general, departments at institutions ranked in the top 50 according to research and development expenditures had more ready access to supercomputers (almost 25 percent) than did departments in other institutions (15 percent).

Respondents indicated that research pursued by one-eighth of the faculty and research staff at their departments was constrained by the speed and/or sequential processing of conventional main frame machines. Disciplines showing the highest proportion of such limitations were atmospheric sciences, mechanical engineering, physics and electrical engineering.

In general, access time to supercomputers was the first-ranked type of assistance needed to increase their use. The other types of assistance often ranked first were opportunities to gain knowledge about the technical capabilities of supercomputers and access through telecommunications links to remote centers with supercomputers.

DETAILED STATISTICAL TABLES

Table 1--Doctoral Departments with Ready or Limited Access to Supercomputers, 1985

Department	Number of Institutions with-			Percentage of Institutions with-		
	Total	Ready Access	Limited Access	Total	Ready Access	Limited Access
	All Institutions					
Electrical Engineering	125	19	106	100.0	15.1	84.9
Mechanical Engineering	122	17	104	100.0	14.2	85.8
Metallurgical/Materials Engineering	73	7	67	100.0	9.3	90.7
Atmospheric Sciences	47	28	19	100.0	60.3	39.7
Geosciences	107	17	90	100.0	15.9	84.1
Cell Biology	138	15	123	100.0	10.9	89.1
Mathematics/Applied Mathematics	144	27	117	100.0	18.4	81.6
Chemistry	166	25	141	100.0	14.9	85.1
Physics	145	34	111	100.0	23.3	76.7
Economics	124	11	113	100.0	8.9	91.1
	Public Institutions					
Electrical Engineering	85	13	72	100.0	15.0	85.0
Mechanical Engineering	82	11	72	100.0	13.3	86.7
Metallurgical/Materials Engineering	49	4	45	100.0	8.1	91.9
Atmospheric Sciences	37	26	11	100.0	71.2	28.8
Geosciences	72	12	60	100.0	17.1	82.9
Cell Biology	89	13	76	100.0	14.1	85.9
Mathematics/Applied Mathematics	97	16	81	100.0	16.9	83.1
Chemistry	112	16	96	100.0	14.6	85.4
Physics	94	23	71	100.0	24.7	75.3
Economics	82	10	72	100.0	11.7	88.3
	Private Institutions					
Electrical Engineering	40	6	34	100.0	15.2	84.8
Mechanical Engineering	39	6	33	100.0	16.1	83.9
Metallurgical/Materials Engineering	24	3	21	100.0	11.7	88.3
Atmospheric Sciences	10	2	8	100.0	20.0	80.0
Geosciences	35	5	30	100.0	13.5	86.5
Cell Biology	49	3	46	100.0	5.2	94.8
Mathematics/Applied Mathematics	47	10	37	100.0	21.6	78.4
Chemistry	54	8	46	100.0	15.6	84.4
Physics	51	11	40	100.0	20.8	79.2
Economics	42	1	41	100.0	3.4	96.6
	Top 50 Institutions					
Electrical Engineering	42	11	32	100.0	25.0	75.0
Mechanical Engineering	40	7	33	100.0	17.9	82.1
Metallurgical/Materials Engineering	32	5	27	100.0	15.8	84.2
Atmospheric Sciences	25	16	9	100.0	64.7	35.3
Geosciences	44	9	36	100.0	19.4	80.6
Cell Biology	45	11	35	100.0	23.3	76.7
Mathematics/Applied Mathematics	46	13	33	100.0	27.3	72.7
Chemistry	46	10	36	100.0	21.2	78.8
Physics	46	9	37	100.0	19.4	80.6
Economics	45	3	42	100.0	6.5	93.5

Table 2--Doctoral Departments with Limited Access Rating Importance of Gaining Access to Supercomputers, 1985

	Number of Institutions				Percentage of Institutions			
Department	Total	Low Priority	Middle Priority	High Priority	Total	Low Priority	Middle Priority	High Priority
				All Institutions				
Electrical Engineering	106	31	58	16	100.0	29.6	55.0	15.3
Mechanical Engineering	104	24	43	37	100.0	22.7	41.4	36.0
Metallurgical/Materials Engineering	67	21	35	11	100.0	31.6	52.5	15.9
Atmospheric Sciences	19	2	8	9	100.0	8.2	43.3	48.5
Geosciences	90	33	34	23	100.0	37.1	37.5	25.4
Cell Biology	123	77	38	8	100.0	62.3	31.3	6.4
Mathematics/Applied Mathematics	17	41	47	30	100.0	34.7	40.0	25.2
Chemistry	141	46	60	34	100.0	32.9	42.7	24.4
Physics	111	15	55	41	100.0	13.5	49.8	36.7
Economics	113	78	30	5	100.0	69.0	26.3	4.7
				Public Institutions				
Electrical Engineering	72	22	40	10	100.0	31.0	54.9	14.1
Mechanical Engineering	72	20	26	26	100.0	27.8	35.7	36.6
Metallurgical/Materials Engineering	45	14	25	7	100.0	30.3	54.4	15.3
Atmospheric Sciences	11	2	6	3	100.0	14.3	57.1	28.6
Geosciences	60	22	22	15	100.0	37.6	37.3	25.1
Cell Biology	76	52	22	3	100.0	67.4	29.0	3.6
Mathematics/Applied Mathematics	81	27	37	17	100.0	33.7	45.7	20.6
Chemistry	96	28	40	27	100.0	29.6	42.1	28.3
Physics	71	11	33	26	100.0	15.9	47.0	37.1
Economics	72	52	18	2	100.0	71.7	25.0	3.3
				Private Institutions				
Electrical Engineering	34	9	19	6	100.0	26.8	55.3	17.9
Mechanical Engineering	33	4	18	11	100.0	11.6	53.8	34.6
Metallurgical/Materials Engineering	21	7	10	4	100.0	34.3	48.5	17.2
Atmospheric Sciences	8	0	2	6	100.0	0.0	25.0	75.0
Geosciences	30	11	11	8	100.0	36.3	37.8	25.9
Cell Biology	46	25	16	5	100.0	54.0	35.0	11.0
Mathematics/Applied Mathematics	37	14	10	13	100.0	36.9	27.8	35.4
Chemistry	46	18	20	7	100.0	39.7	44.0	16.3
Physics	40	4	22	15	100.0	9.2	54.8	36.0
Economics	41	26	12	3	100.0	64.3	28.6	7.1
				Top 50 Institutions				
Electrical Engineering	32	9	15	8	100.0	28.6	47.6	23.8
Mechanical Engineering	33	7	10	16	100.0	21.7	30.4	47.8
Metallurgical/Materials Engineering	27	8	12	7	100.0	31.3	43.8	25.0
Atmospheric Sciences	9	0	1	7	100.0	0.0	16.7	83.3
Geosciences	36	11	13	11	100.0	32.0	36.0	32.0
Cell Biology	35	15	14	6	100.0	43.5	39.1	17.4
Mathematics/Applied Mathematics	33	10	11	13	100.0	29.2	33.3	37.5
Chemistry	36	4	15	17	100.0	11.5	42.3	46.2
Physics	37	4	16	16	100.0	12.0	44.0	44.0
Economics	42	28	12	3	100.0	65.5	27.6	6.9

Table 3--Present Level of Computer Use by Doctoral Department Faculty/Research Staff, 1985

Departments	Total Faculty		Using Supercomputers		Planning to Use Super-computers		Using Conventional Computers		Currently Not Using Conventional Computers		Computer Use Unknown	
	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
All Institutions												
Electrical Engineering	3,473	100.0	199	5.7	269	7.7	2,075	59.7	581	16.7	349	10.1
Mechanical Engineering	2,654	100.0	175	6.6	288	10.8	1,455	54.8	573	21.6	163	6.1
Metallurgical/Materials Engineering	1,029	100.0	29	2.8	82	8.0	433	42.1	328	31.9	158	15.3
Atmospheric Sciences	839	100.0	190	22.6	104	12.4	364	43.4	157	18.7	24	2.9
Geosciences	2,110	100.0	113	5.4	156	7.4	943	44.7	731	34.6	167	7.9
Cell Biology	4,584	100.0	88	1.9	119	2.6	1,565	34.1	2,478	54.1	335	7.3
Mathematics/Applied Math	5,236	100.0	213	4.1	280	5.3	1,527	29.2	2,757	52.6	460	8.8
Chemistry	5,534	100.0	155	2.8	292	5.3	2,254	40.7	2,464	44.5	369	6.7
Physics	4,960	100.0	368	7.4	441	8.9	2,491	50.2	1,226	24.7	435	8.8
Economics	3,069	100.0	48	1.6	50	1.6	1,680	54.7	1,118	36.4	172	5.6
Public Institutions												
Electrical Engineering	2,313	100.0	148	6.4	189	8.2	1,331	57.5	423	18.3	223	9.6
Mechanical Engineering	1,891	100.0	126	6.7	218	11.5	961	50.8	447	23.6	138	7.3
Metallurgical/Materials Engineering	681	100.0	21	3.1	57	8.3	315	46.1	234	34.3	56	8.2
Atmospheric Sciences	713	100.0	178	25.0	92	12.9	290	40.7	135	18.9	18	2.5
Geosciences	1,528	100.0	97	6.3	115	7.5	688	45.0	519	33.9	110	7.2
Cell Biology	3,189	100.0	54	1.7	50	1.6	1,117	35.0	1,773	55.6	195	6.1
Mathematics/Applied Math	3,969	100.0	153	3.9	207	5.2	1,153	29.1	2,141	53.9	314	7.9
Chemistry	3,803	100.0	108	2.8	196	5.2	1,491	39.2	1,804	47.4	205	5.4
Physics	3,449	100.0	277	8.0	291	8.4	1,724	50.0	827	24.0	331	9.6
Economics	2,096	100.0	34	1.6	37	1.8	1,203	57.4	702	33.5	120	5.7

Table 3--Continued

Departments	Total Faculty No.	Total Faculty %	Using Supercomputers No.	Using Supercomputers %	Planning to Use Supercomputers No.	Planning to Use Supercomputers %	Using Conventional Computers No	Using Conventional Computers %	Currently Not Using Conventional Computers No.	Currently Not Using Conventional Computers %	Computer Use Unknown No.	Computer Use Unknown %
Private Institutions												
Electrical Engineering	1,159	100.0	51	4.4	80	6.9	744	64.2	158	13.6	126	10.9
Mechanical Engineering	763	100.0	49	6.4	69	9.1	493	64.7	126	16.5	25	3.3
Metallurgical/Materials Engineering	348	100.0	8	2.3	25	7.2	118	34.0	94	27.1	102	29.4
Atmospheric Sciences	126	100.0	12	9.5	12	9.5	74	58.7	22	17.5	6	4.8
Geosciences	582	100.0	16	2.7	41	7.0	255	43.8	213	36.6	57	10.0
Cell Biology	1,396	100.0	35	2.5	69	4.9	448	32.1	705	50.5	140	10.0
Mathematics/Applied Math	1,268	100.0	60	4.7	72	5.7	374	29.5	616	48.6	145	11.4
Chemistry	1,730	100.0	47	2.7	97	5.6	763	44.1	660	38.2	164	9.5
Physics	1,511	100.0	91	6.0	150	9.9	767	50.8	399	26.4	103	6.8
Economics	973	100.0	14	1.4	13	1.3	477	49.0	416	42.8	52	5.3
Top 50 Institutions												
Electrical Engineering	1,781	100.0	83	4.7	113	6.3	1,041	58.4	302	17.0	243	13.6
Mechanical Engineering	998	100.0	80	8.0	126	12.6	562	56.3	190	19.0	40	4.0
Metallurgical/Materials Engineering	481	100.0	25	5.2	52	10.8	160	33.3	137	28.5	107	22.2
Atmospheric Sciences	395	100.0	113	28.6	43	10.9	151	38.2	75	19.0	13	3.3
Geosciences	1,054	100.0	61	5.8	82	7.8	453	43.0	347	33.0	110	10.4
Cell Biology	1,818	100.0	57	3.1	68	3.7	618	34.0	909	50.0	167	9.2
Mathematics/Applied Math	2,332	100.0	111	4.8	108	4.6	671	28.8	1,194	51.2	247	10.0
Chemistry	2,606	100.0	92	3.5	149	5.7	1,357	52.1	888	34.1	121	4.6
Physics	2,239	100.0	161	7.2	182	8.1	1,175	52.5	531	23.7	189	8.4
Economics	1,456	100.0	7	0.5	19	1.3	826	56.7	507	34.8	96	6.6

Table 4--Applicability of Supercomputers to Present Lines of Research at Doctoral Departments, 1985

	Number of Faculty/Research Staff				Percentage of Faculty/Research Staff			
			Currently Constrained by				Currently Constrained by	
Department	Total Faculty	Currently Using Super-computers*	Limited Speed	Sequential Processing	Total Faculty	Currently Using Super-computers*	Limited Speed	Sequential Processing
				All Institutions				
Electrical Engineering	3,473	281	497	433	100.0	8.1	14.3	12.5
Mechanical Engineering	2,654	225	500	336	100.0	8.5	18.9	12.7
Metallurgical/Materials Engineering	1,029	43	105	54	100.0	4.2	10.2	5.2
Atmospheric Sciences	839	236	163	95	100.0	28.1	19.5	11.3
Geosciences	2,110	166	228	122	100.0	7.9	10.8	5.8
Cell Biology	4,584	126	236	194	100.0	2.7	5.1	4.2
Mathematics/Applied Mathematics	5,236	303	457	341	100.0	5.8	8.7	6.5
Chemistry	5,534	172	571	304	100.0	3.1	10.3	5.5
Physics	4,960	508	845	435	100.0	10.2	17.0	8.8
Economics	3,069	85	214	94	100.0	2.8	7.0	3.1
				Public Institutions				
Electrical Engineering	2,313	147	348	286	100.0	6.3	15.0	12.3
Mechanical Engineering	1,891	159	349	241	100.0	8.4	18.5	12.8
Metallurgical/Materials Engineering	681	29	70	39	100.0	4.3	10.3	5.7
Atmospheric Sciences	713	218	155	95	100.0	30.5	21.8	13.3
Geosciences	1,528	129	156	87	100.0	8.5	10.2	5.7
Cell Biology	3,189	95	145	120	100.0	3.0	4.5	3.8
Mathematics/Applied Mathematics	3,969	231	358	275	100.0	5.8	9.0	6.9
Chemistry	3,803	127	392	260	100.0	3.3	10.3	6.8
Physics	3,449	360	593	299	100.0	10.4	17.2	8.7
Economics	2,096	58	140	58	100.0	2.8	6.7	2.8
				Private Institutions				
Electrical Engineering	1,159	135	149	147	100.0	11.6	12.8	12.7
Mechanical Engineering	763	67	151	94	100.0	8.7	19.8	12.4
Metallurgical/Materials Engineering	348	14	35	15	100.0	4.0	10.0	4.3
Atmospheric Sciences	126	18	8	0	100.0	14.3	6.3	0.0
Geosciences	582	37	72	35	100.0	6.4	12.4	6.1
Cell Biology	1,396	31	91	74	100.0	2.2	6.5	5.3
Mathematics/Applied Mathematics	1,268	72	99	66	100.0	5.7	7.8	5.2
Chemistry	1,730	46	179	44	100.0	2.6	10.4	2.6
Physics	1,511	148	253	137	100.0	9.8	16.7	9.0
Economics	973	28	74	36	100.0	2.8	7.6	3.7
				Top 50 Institutions				
Electrical Engineering	1,781	84	252	227	100.0	4.7	14.2	12.7
Mechanical Engineering	998	96	197	106	100.0	9.6	19.8	10.6
Metallurgical/Materials Engineering	481	23	37	22	100.0	4.9	7.6	4.5
Atmospheric Sciences	395	118	49	28	100.0	29.7	12.3	7.1
Geosciences	1,054	100	116	60	100.0	9.5	11.0	5.7
Cell Biology	1,818	53	177	149	100.0	2.9	9.7	8.2
Mathematics/Applied Mathematics	2,332	160	206	147	100.0	6.9	8.8	6.3
Chemistry	2,606	96	309	142	100.0	3.7	11.8	5.4
Physics	2,239	228	408	160	100.0	10.2	18.2	7.1
Economics	1,456	17	68	29	100.0	1.2	4.7	2.0

* Also includes those already in touch with appropriate research facilities.

Table 5--Applicability of Supercomputers to Present Lines of Research, by Degree of Access to Supercomputers, 1985

	Number of Faculty/Research Staff				Percentage of Faculty/Research Staff			
			Currently Constrained by				Currently Constrained by	
Department	Total Faculty	Currently Using Super-computers*	Limited Speed	Sequential Processing	Total Faculty	Currently Using Super-computers*	Limited Speed	Sequential Processing
Institutions Where Faculty Have Ready Access to Supercomputers								
Electrical Engineering	882	88	156	150	100.0	9.9	17.7	17.0
Mechanical Engineering	333	48	64	50	100.0	14.4	19.3	15.1
Metallurgical/Materials Engineering	53	4	4	1	100.0	7.7	7.9	1.9
Atmospheric Sciences	583	214	131	81	100.0	36.7	22.5	14.0
Geosciences	483	55	53	35	100.0	11.3	11.1	7.2
Cell Biology	600	23	84	79	100.0	3.9	14.0	13.1
Mathematics/Applied Mathematics	1,060	159	79	65	100.0	15.0	7.4	6.1
Chemistry	950	52	88	48	100.0	5.5	9.2	5.1
Physics	1,460	224	230	133	100.0	15.4	15.7	9.1
Economics	347	46	19	14	100.0	13.3	5.6	4.1
Institutions Where Faculty Have Limited Access to Supercomputers								
Electrical Engineering	2,591	194	341	283	100.0	7.5	13.1	10.9
Mechanical Engineering	2,321	178	436	286	100.0	7.7	18.8	12.3
Metallurgical/Materials Engineering	977	39	101	53	100.0	4.0	10.4	5.4
Atmospheric Sciences	256	22	32	14	100.0	8.4	12.6	5.3
Geosciences	1,627	112	175	88	100.0	6.9	10.8	5.4
Cell Biology	3,984	103	152	115	100.0	2.6	3.8	2.9
Mathematics/Applied Mathematics	4,176	144	379	276	100.0	3.5	9.1	6.6
Chemistry	4,584	120	483	256	100.0	2.6	10.5	5.6
Physics	3,500	284	616	302	100.0	8.1	17.6	8.6
Economics	2,721	39	195	80	100.0	1.4	7.2	2.9

* Also includes those already in touch with appropriate research facilities.

Table 6--Present Use of Scientific Work Stations by Doctoral Department Faculty/Research Staff, 1985

Department	Total Faculty	Faculty Using Work Stations		Total Faculty	Faculty Using Work Stations	
		Number	Percent		Number	Percent
	All Institutions			**Top 50 Institutions**		
Electrical Engineering	3,473	883	25.4	1,781	398	22.3
Mechanical Engineering	2,654	550	20.7	998	217	21.8
Metallurgical/Materials Engineering	1,029	225	21.8	481	85	17.7
Atmospheric Sciences	839	206	24.6	395	101	25.7
Geosciences	2,110	559	26.5	1,054	190	18.0
Cell Biology	4,584	415	9.0	1,818	170	9.3
Mathematics/Applied Mathematics	5,236	613	11.7	2,332	303	13.0
Chemistry	5,534	642	11.6	2,606	215	8.3
Physics	4,960	677	13.6	2,239	218	9.7
Economics	3,069	438	14.3	1,456	238	16.3
	Public Institutions			**Private Institutions**		
Electrical Engineering	2,313	573	24.8	1,159	310	26.7
Mechanical Engineering	1,891	373	19.7	763	177	23.3
Metallurgical/Materials Engineering	681	168	24.6	348	57	16.4
Atmospheric Sciences	713	202	28.3	126	4	3.2
Geosciences	1,528	410	26.8	582	149	25.6
Cell Biology	3,189	269	8.4	1,396	146	10.4
Mathematics/Applied Mathematics	3,969	394	9.9	1,268	219	17.3
Chemistry	3,803	345	9.1	1,730	297	17.1
Physics	3,449	461	13.4	1,511	216	14.3
Economics	2,096	315	15.0	973	123	12.7

Table 7--Present Use of Scientific Work Stations by Doctoral Department Faculty/Research Staff,by Degree of Access to Supercomputers, 1985

	Ready Access			Limited Access		
		Faculty Using Work Stations			Faculty Using Work Stations	
Department	Total Faculty	Number	Percent	Total Faculty	Number	Percent
			All Institutions			
Electrical Engineering	882	306	34.7	2,591	577	22.3
Mechanical Engineering	333	107	32.0	2,321	444	19.1
Metallurgical/Materials Engineering	53	19	35.8	977	206	21.1
Atmospheric Sciences	583	160	27.4	256	47	18.2
Geosciences	483	178	36.9	1,627	381	23.4
Cell Biology	600	103	17.2	3,984	311	7.8
Mathematics/Applied Mathematics	1,060	198	18.7	4,176	415	9.9
Chemistry	950	88	9.2	4,584	554	12.1
Physics	1,460	267	18.3	3,500	410	11.7
Economics	347	38	11.1	2,721	400	14.7
			Public Institutions			
Electrical Engineering	456	177	38.8	1,857	396	21.3
Mechanical Engineering	241	84	34.8	1,650	289	17.5
Metallurgical/Materials Engineering	37	15	40.7	645	153	23.7
Atmospheric Sciences	543	160	29.4	170	43	25.0
Geosciences	425	135	31.7	1,103	275	24.9
Cell Biology	550	103	18.8	2,638	165	6.3
Mathematics/Applied Mathematics	756	101	13.4	3,213	293	9.1
Chemistry	580	32	5.5	3,223	313	9.7
Physics	1,126	228	20.3	2,323	233	10.0
Economics	310	38	12.4	1,786	276	15.5
			Private Institutions			
Electrical Engineering	426	129	30.4	734	181	24.6
Mechanical Engineering	92	23	24.7	671	155	23.1
Metallurgical/Materials Engineering	16	4	24.8	332	53	16.0
Atmospheric Sciences	40	0	0.0	86	4	4.7
Geosciences	57	43	75.7	524	106	20.1
Cell Biology	50	0	0.0	1,346	146	10.8
Mathematics/Applied Mathematics	304	97	31.9	963	122	12.6
Chemistry	370	56	15.1	1,360	241	17.7
Physics	334	38	11.5	1,177	177	15.1
Economics	38	0	0.0	935	123	13.2
			Top 50 Institutions			
Electrical Engineering	698	216	31.0	1,083	182	16.8
Mechanical Engineering	147	54	36.9	851	163	19.2
Metallurgical/Materials Engineering	45	18	40.7	436	67	15.3
Atmospheric Sciences	307	94	30.6	88	7	8.3
Geosciences	279	37	13.3	775	153	19.7
Cell Biology	459	42	9.2	1,359	128	9.4
Mathematics/Applied Mathematics	553	121	21.9	1,779	182	10.2
Chemistry	552	24	4.3	2,054	192	9.3
Physics	490	28	5.7	1,749	189	10.8
Economics	170	6	3.4	1,286	232	18.0

Table 8--Number of Departments Ranking Assistance Needed to Increase Use of Supercomputers, 1985

Types of Assistance	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
	All Institutions				
Opportunities to gain knowledge of technical capabilities of supercomputers	214	140	98	89	117
Opportunities to interact with researchers skilled in conceptualizing problems	103	112	169	129	195
Access through telecommunications links to remote centers	163	252	174	123	101
Access to time on supercomputers, disregarding funding constraints	363	207	153	118	67
Support for software and programming to use supercomputers	82	156	183	219	142
Access to work stations and graphics capabilities to interface with supercomputers	136	146	202	179	101
Opportunities to see results of research using supercomputers	123	125	73	79	99
	Public Institutions				
Opportunities to gain knowledge of technical capabilities of supercomputers	151	99	63	53	84
Opportunities to interact with researchers skilled in conceptualizing problems	67	70	111	91	143
Access through telecommunications links to remote centers	112	170	127	81	63
Access to time on supercomputers, disregarding funding constraints	233	127	107	87	45
Support for software and programming to use supercomputers	51	111	119	153	90
Access to work stations and graphics capabilities to interface with supercomputers	84	99	135	123	65
Opportunities to see results of research using supercomputers	78	73	47	50	71
	Private Institutions				
Opportunities to gain knowledge of technical capabilities of supercomputers	63	41	34	36	33
Opportunities to interact with researchers skilled in conceptualizing problems	36	42	58	38	52
Access through telecommunications links to remote centers	51	82	47	42	38
Access to time on supercomputers, disregarding funding constraints	130	80	47	31	22
Support for software and programming to use supercomputers	31	45	64	66	52
Access to work stations and graphics capabilities to interface with supercomputers	52	48	67	56	36
Opportunities to see results of research using supercomputers	45	51	27	29	29
	Top 50 Institutions				
Opportunities to gain knowledge of technical capabilities of supercomputers	64	43	36	30	52
Opportunities to interact with researchers skilled in conceptualizing problems	28	37	42	70	70
Access through telecommunications links to remote centers	55	100	68	34	31
Access to time on supercomputers, disregarding funding constraints	152	86	48	40	24
Support for software and programming to use supercomputers	33	56	81	88	42
Access to work stations and graphics capabilities to interface with supercomputers	52	56	74	56	39
Opportunities to see results of research using supercomputers	32	33	25	28	43

Table 9 - Percentage of Departments Ranking First Types of Assistance Needed to Increase Use of Supercomputers, 1985

Type of Assistance	Engineering			Atmos- pheric Sciences	Geo- sciences	Cell Biology	Mathe- matics	Chem- istry	Physics	Econom- ics
	Elec- trical	Mechan- ical	Metal- lurgical							
Opportunities to gain knowledge of technical capabilities of supercomputers	13.6	19.2	20.8	8.3	19.0	27.5	10.4	13.3	12.4	33.9
Opportunities to interact with researchers skilled in conceptualizing problems	8.8	3.3	5.6	6.3	11.4	16.7	9.0	8.5	5.5	9.7
Access through telecommunications links to remote centers	12.8	19.2	12.5	18.8	19.0	5.1	12.5	17.0	21.4	2.4
Access to time on supercomputers, disregarding funding constraints	24.0	44.2	33.3	35.4	22.9	5.8	32.7	40.0	48.3	19.4
Support for software and programming to use supercomputers	8.0	3.3	1.4	16.7	3.8	5.8	9.0	6.1	5.5	13.7
Access to work stations and graphics capabilities to interface with supercomputers	24.8	7.5	6.9	18.8	9.5	8.7	18.8	9.1	8.3	5.6
Opportunities to see results of research using supercomputers	9.6	10.0	15.3	4.2	9.5	19.6	7.6	7.3	4.8	15.3

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

HEP Survey No. 69

ACCESS TO COMPUTERS FOR RESEARCH

RESPONDENT DESIGNATOR FORM

For each department/discipline listed, indicate whether your institution conducts doctoral study in the field. If it does, please complete a questionnaire for that department. Most large universities will thus complete 10 questionnaires--one for each department listed.

Is doctoral study/research conducted in the department/discipline?			NAME AND TELEPHONE of person designated to respond for the department listed. (Only doctoral level departments/disciplines are to be surveyed.)
YES	NO	DEPARTMENT/DISCIPLINE	
		ENGINEERING	
____	____	Electrical Engineering	____
____	____	Mechanical Engineering	____
____	____	Metallurgical and Materials Engineering	____
		ENVIRONMENTAL SCIENCES	
____	____	Atmospheric Sciences	____
____	____	Geosciences	____
		LIFE SCIENCES	
____	____	Cell Biology	____
		MATHEMATICAL/COMPUTER SCIENCES	
____	____	Mathematics & Applied Mathematics	____
		PHYSICAL SCIENCES	
____	____	Chemistry	____
____	____	Physics	____
		SOCIAL SCIENCES	
____	____	Economics	____

Please indicate whether **follow-up contact** should be made through your office or directly with a department person listed above.

☐ Follow-up contact should be with the HEP Representative.

☐ Follow-up contact should be made directly with the department.

OMB #3145-0009
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AMERICAN
COUNCIL ON
EDUCATION

Higher Education Panel Survey Number 69

ACCESS TO COMPUTERS FOR RESEARCH

This survey requests information about computer use and plans for computer use by faculty and other professional research staff in this department. Some of the questions are subjective; your judgments are important to us. Please give us your estimates wherever you can.

Please use the following distinctions when responding to the questions.

Advanced large-scale computers, or advanced scientific computers (sometimes referred to in the media as "supercomputers"): machines performing at least 100 million floating point operations per second. At present, only **Cray X-MP** and **Cyber 205** machines meet this criterion.

Conventional main frame computers: computers with capacity less than that of advanced large-scale machines. This group includes those in the IBM-308X series, VAX-7XX series, and the CDC-7600.

Scientific work station: a 32-bit machine with memory of at least one megabyte; screen resolution on the order of 800 × 1,000 in order to adequately display a full range of graphics; and the ability to work in an integrated network environment with UNIX-like operating system and a Fortran compiler. Exclude personal computers used as word processors and word processors with business graphics capabilities.

Department of ______________________________

1. **Faculty and Research Staff.** What is the total number of full-time faculty and other professional research staff in this Department? *Exclude* (1) faculty who are away from campus on sabbatical and (2) graduate students participating in research projects, whether salaried or on other support.

Full-time faculty and research staff (headcount) ______

2. **Present Use of Computers and Scientific Work Stations.**

a. Computers. How many of the persons reported in question 1 above make use of **advanced large-scale computers** as described here? Please account for each person only once in the list below and treat the list as hierarchical.

Level of Computer Use	Number of Persons
1. Currently using or have used advanced large-scale computers.	______
2. Currently formulating plans for research requiring advanced large-scale computers, or taking concrete steps to pursue an interest in them.	______
3. Now using conventional main frame computers, (e.g., IBM, VAX, CDC-7600, etc.) as an integral part of their research.	______
4. Now making no use of conventional main frame computers.	______
5. Unable to determine or do not know.	______
Total (should agree with figure in question 1)	______

b. Scientific Work Stations. How many of the persons reported in question 1 above make regular use of scientific work stations (as defined on the opposite page) to support their professional research?

Number of Persons ______

3. **Applicability of Advance Large-scale Computers to Present Lines of Research.** How many of the persons reported in question 1 are pursuing lines of research that *could benefit* from access to **advanced large-scale computers?** Include persons in as many categories as appropriate.

Category	Number of Persons
a. Personnel who are already in touch with appropriate research facilities or are using advanced large-scale computers.	______
b. Personnel whose work is now constrained by the capacity or speed of conventional main frame computers.	______
c. Personnel whose work is now constrained by the sequential processing design of main frame computers, as opposed to the parallel processing capabilities of advanced large-scale computers.	______

Continued on next page.

4. **Need for Assistance.** Which of the following types of assistance would have the *greatest immediate impact* on increasing the use of **advanced large-scale computers** by the faculty and research staff identified in question 1? Please rank, in order of importance, as many types of assistance as you believe applicable. Use "1" for the highest ranked item.

Type of Assistance	Rank
a. Opportunities to gain knowledge of the technical capabilities of advanced large-scale computers.	______
b. Opportunities to interact with researchers skilled at conceptualizing problems for advanced large-scale computers.	______
c. Access through telecommunications links to remote centers with advanced large-scale computers.	______
d. Access to time on advanced large-scale computers, disregarding funding constraints.	______
e. Support for software and programming to use advanced large-scale computers.	______
f. Access to scientific work stations and graphics capabilities to interface with advanced large-scale computers.	______
g. Opportunities to see the results of uses of advanced large-scale computers to solve a variety of problems; for example, opportunities to attend special workshops and seminars.	______
h. Other needs; please specify.	______

____

____

____

5. **Current Access.** Do faculty members and other professional research staff in this department have ready access to an **advanced large-scale computer?**

Yes ______
No ______

If no, what level of priority does obtaining ready access to an advanced large-scale computer have? Circle the appropriate number below.

High priority	3
Medium priority	2
Low priority	1

Thank you for your assistance. Please return this form to

Higher Education Panel
American Council on Education
One Dupont Circle Suite 829
Washington, DC 20036

by **May 17, 1985.**

Please keep a copy of this form for your records.

Person completing the form:

Name ____________________________

Title ____________________________

Telephone (_____) ______________________

APPENDIX B: METHODS SUMMARY

The Higher Education Panel forms the basis of an ongoing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct specialized surveys on topics of current policy interest to the higher education community and to governmental agencies.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities, divided into two half-samples of 520 institutions each. Institutions were drawn from the more than 3,200 colleges and universities listed in the National Center for Education Statistics' Education Directory, Colleges and Universities. All institutions in the population are grouped according to the Panel's stratification design, which is based primarily upon institutional type (doctorate-granting, comprehensive, baccalaureate, specialized and two-year academic or occupational), control (public, private), and size (full-time equivalent undergraduate enrollment, full-time equivalent graduate enrollment, and educational and general expenditures).
For any given survey, either the entire Panel, a half-sample, or an appropriate subgroup is used.

The survey operation is dependent upon a network of campus representatives who, through their presidents, have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus officials for response.

The survey population was defined as all major research universities that award five or more doctoral degrees and have at least one of the departments under study: that is, electrical engineering, mechanical engineering, metallurgical/materials engineering, atmospheric sciences, geosciences, cell biology, mathematics/applied mathematics, chemistry, physics, and economics.- With the exception of schools of engineering, all specialized schools (that is, schools of divinity, medicine, other health, business, fine arts, law, and education) were excluded.

The survey instrument (see Appendix A) was mailed to 207 institutions in mid-April 1985. Responses from 23 institutions indicated that they did not meet survey criteria, reducing the number of institutions from which substantive responses could be expected to 184. After mail and telephone followups, 167 institutions (91 percent) responded with at least one departmental questionnaire completed.

Non-Response Adjustment Procedure

After examining the National Center for Education Statistics' records and other listings, it was determined that 185 institutions (only one non-Panel member) and about 1,190 departments met the study eligibility criteria nation-wide. For purposes of non-response adjustment, and to compensate for the non-Panel institution which was treated as a non-respondent, departmental weights were developed for each institution in each stratification cell, based on the ratio of responding departments to nonresponding departments. Due to small number of institutions involved, engineering schools from Panel stratification cells 5 (public specialized schools) and 6 (private specialized schools) were combined with cells 3 (public comprehensive universities) and 4 (private comprehensive universities). Further, separate weights were developed and applied to data showing differences by top 50 status of institutions. The procedure used was again based on the ratio of responding departments to nonresponding departments in each top 50 and other institution in each stratification cell.

Tables B-1 and B-2 show the number of population and responding departments in each cell and corresponding weights. Table B-3 presents the weighted national estimates (number of departments and faculty) reported in the study.

Table B-1. Departmental Population and Response Counts
by Stratification Cells and for Top 50 Institutions

Department	Public Doctoral		Private Doctoral		*Public Comprehensive		*Private Comprehensive		Top 50 Institutions	
	Responding	Population	Responding	Population	Responding	Population	Responding	Population	Responding	Population
Electrical Engineering	57	74	23	35	10	11	5	5	28	42
Mechanical Engineering	49	69	27	34	11	12	4	5	28	40
Metallurgical/Materials Engineering	31	43	11	20	4	5	4	4	18	30
Atmospheric Sciences	23	35	5	10	2	2	0	1	17	25
Geosciences	52	65	20	31	6	7	1	2	30	43
Cell Biology	58	80	32	41	6	9	7	8	30	45
Mathematics/Applied Math	75	90	29	42	7	7	5	5	33	46
Chemistry	74	95	38	47	16	16	7	7	33	46
Physics	65	84	34	45	9	10	5	6	31	46
Economics	64	77	29	42	4	5	0	0	31	45

Table B-2. Departmental Weights, by Type and Control of Institution

Department	Public Doctoral	Private Doctoral	*Public Comprehensive	*Private Comprehensive	Top 50 Institutions
Electrical Engineering	1.30	1.52	1.10	1.00	1.50
Mechanical Engineering	1.41	1.26	1.09	1.25	1.43
Metallurgical/Materials Engineering	1.39	1.82	1.25	1.00	1.67
Atmospheric Sciences	1.52	2.00	1.00	0.0	1.47
Geosciences	1.25	1.55	1.17	2.00	1.43
Cell Biology	1.38	1.28	1.50	1.14	1.50
Mathematics/Applied Math	1.20	1.45	1.00	1.00	1.39
Chemistry	1.28	1.24	1.00	1.00	1.39
Physics	1.29	1.32	1.11	1.20	1.48
Economics	1.20	1.45	1.25	0.0	1.45

* Includes engineering schools from cells 5 & 6.

Table B-3 Weighted Number of Departments and Faculty, by Control and Top 50 Status of Institutions*

Departments	All		Public		Private		Top 50		Other	
	Dept.	Faculty	Dept.	Faculty	Dept.	Faculty	Dept.	Faculty	Dept.	Faculty
Electrical Engineering	125	3,473	85	2,313	40	1,159	42	1,781	83	1,692
Mechanical Engineering	120	2,654	81	1,891	39	763	40	998	80	1,656
Metallurgical/Materials Engineering	72	1,029	48	681	24	348	30	481	42	548
Atmospheric Sciences	48	839	37	713	11	126	25	395	23	444
Geosciences	105	2,110	72	1,528	33	582	43	1,054	62	1,056
Cell Biology	138	4,584	89	3,189	49	1,396	45	1,818	93	2,766
Mathematics/Applied Math	144	5,236	97	3,969	47	1,268	46	2,332	98	2,904
Chemistry	165	5,534	111	3,803	54	1,730	46	2,606	119	2,928
Physics	145	4,960	94	3,449	51	1,511	46	2,239	99	2,721
Economics	124	3,069	82	2,096	42	973	45	1,456	79	1,613
Total	1,186	33,488	796	23,532	390	9,856	408	15,160	778	18,328

* Totals may not add due to rounding involved in weighting process.

Comparison of Respondents and Nonrespondents

Departmental response rates varied from a high of 82 percent (chemistry) to a low of 63 percent (atmospheric sciences). With minor exceptions, departments in public institutions were somewhat more likely to respond to the survey than were departments in private institutions (see Table B-4). Further, departments in the top 50 institutions were less likely to respond than were those in other institutions. The only exception was departments of atmospheric sciences where more of those located in the top 50 institutions than in others responded to the survey.

Table B-4. Departmental Response Rated by Control and Top 50 Status of Institutions (In Percentages)

Departments	Total	Public	Private	Top 50	Other
Electrical Engineering	76.0	78.8	70.0	66.7	80.7
Mechanical Engineering	75.8	74.1	79.5	70.0	78.8
Metallurgical/Materials Engineering	69.4	72.9	62.5	60.0	76.2
Atmospheric Sciences	62.5	67.6	45.5	68.0	56.5
Geosciences	74.3	79.2	63.6	67.4	79.0
Cell Biology	74.6	71.9	79.6	66.7	78.5
Mathematics/Applied Math	80.6	84.5	72.3	71.7	84.7
Chemistry	81.8	81.1	83.3	71.7	85.7
Physics	77.9	78.7	76.5	67.4	82.8
Economics	78.2	82.9	69.0	68.9	83.5

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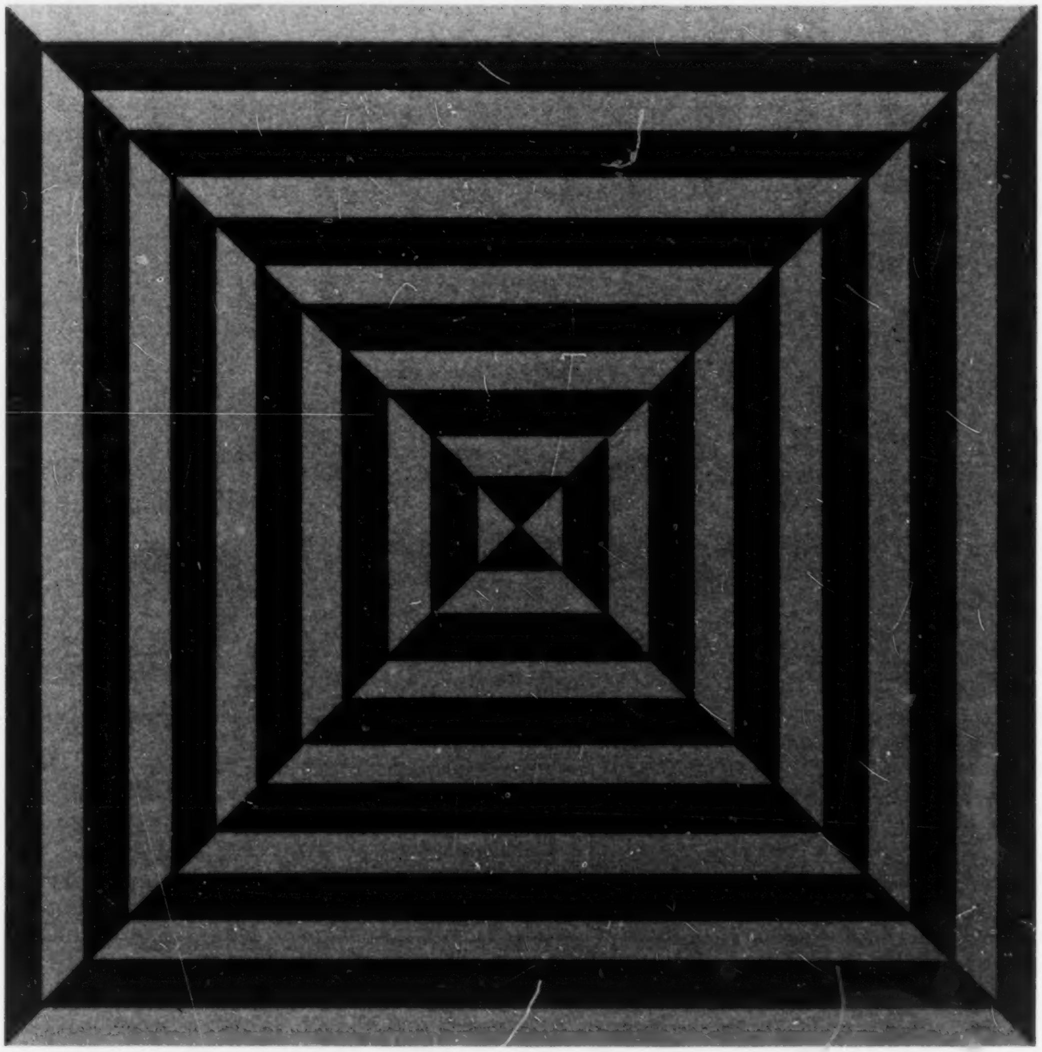
CAMPUS TRENDS, 1985

Elaine El-Khawas



HIGHER EDUCATION PANEL REPORT NUMBER 71 FEBRUARY 1986

American Council on Education

AMERICAN COUNCIL ON EDUCATION

Robert H. Atwell, President

The American Council on Education, founded in 1918, is a council of educational organizations and institutions. Its purpose is to advance education and educational methods through comprehensive voluntary and cooperative action on the part of American educational associations, organizations and institutions.

The Higher Education Panel is a survey research program established by the Council for the purpose of securing policy-related information quickly from representative samples of colleges and universities. Higher Education Panel Reports are designed to expedite communication of the Panel's survey findings to policy-makers in government, in the associations, and in educational institutions across the nation.

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Campus Trends, 1985

Elaine El-Khawas

Higher Education Panel Reports
Number 71 February 1986

American Council on Education
Washington, D.C. 20036

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BACKGROUND AND HIGHLIGHTS

This report offers findings from the second in a series of surveys of Campus Trends. These surveys are designed to provide timely information on changes taking place in the policies and practices of American colleges and universities.

For this second report, campus actions on curricular change are given major attention along with early campus responses to national reports calling for education reform. This report also examines faculty hiring practices, perceptions about institutional status, college linkages with business and industry, changes in enrollment, and the use of long-range planning and other administrative practices. Major highlights include:

- The recent national reports on higher education are being discussed on the nation's campuses. As of summer 1985, 6 in 10 institutions reported discussions among senior administrators, 45 percent reported discussions in faculty meetings, and 24 percent reported discussions in meetings of their boards.
- Campus officials identified a variety of areas where changes are already being planned in response to the reports. Two related themes are drawing the greatest attention: the need to measure student learning and to emphasize the competencies that students should gain through their studies.
- Curricular change continues to occupy center stage on the nation's campuses. More than 80 percent of responding colleges and universities were currently reviewing the curriculum or had recently done so.
- Almost all of these reviews involved attention to mathematical or computer-related skills, writing or such other competencies as communication and reasoning.
- Half or more of the four-year institutions are currently considering increased attention to international matters and foreign language study. There also is new attention to values or ethics: 61 percent of baccalaureate colleges and 54 percent of universities reported this as a topic currently being discussed.
- About 4 in 10 colleges have experienced sizeable enrollment changes during the 1980s. The most notable changes involved shifts away from full-time students and toward part-time and older students. Also striking is the evidence of significant increases in commuter students and foreign students.
- Fully 21 percent of institutions reported a net loss in faculty positions compared to a year earlier. However, 32 percent of colleges reported no change and almost half (48 percent) reported a net gain in faculty positions.
- Only 45 percent of institutions reported that the level of faculty compensation was better today than several years ago. Another 15 percent reported that faculty compensation was worse today.
- Most colleges hired new faculty during 1984–85, and were about as likely to hire faculty in term or contract positions as in tenure-track positions.
- About 1 in 4 institutions reported that they had retrenchment procedures underway to cut back on the number of faculty. Close to half said they had procedures to retrain faculty for changing program needs.
- Almost all of the nation's colleges and universities have procedures in place for long-range planning (87 percent) and for program review (83 percent). Regular monitoring of student attrition is also widespread (86 percent). More than half of the institutions have developed procedures for systematic faculty planning.
- Close to half of the nation's colleges and universities have at some time completed an analysis of the economic impact of their institution on their state or surrounding community.
- Campus use of personal computers appears to be growing. Close to half of colleges and universities now offer writing courses that are based on microcomputer use.
- Among the nation's colleges and universities, almost all have formal links with the corporate community. About two-thirds of these institutions offered courses, both credit and noncredit, for business employees on company premises.
- Close to half of the institutions reported participation in partnerships with business to foster state or regional economic development. About 4 in 10 institutions reported that they were active in partnerships with the business community to assist the high schools in their area.

METHODS

The Higher Education Panel forms the basis of an ongoing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct specialized surveys on topics of current policy interest to the higher education community.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities, divided into two half-samples of 520 institutions each. Institutions were drawn from the more than 3,200 colleges and universities listed in the National Center for Education Statistics' *Education Directory, Colleges and Universities*. All institutions in the population were grouped according to the Panel's stratification design, which is based primarily upon institution type, control, and size. For any given survey, either the entire Panel, a half-sample or an appropriate subgroup is used.

The survey operation is dependent upon a network of campus representatives who, through their presidents, have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus official for response.

The sample for this study consisted of 468 two-year colleges, four-year colleges and universities in one of the half-samples. Specialized religious institutions (such as rabbinical seminaries) were excluded. The questionnaire (see Appendix A) was mailed on May 30, 1985, with the request that it be completed by the academic vice-president or another senior official with a broad view of the institution. After a series of mail and telephone followups, 398 responses were received or 85 percent of those surveyed. Actual respondents included: provosts, deans, or academic vice presidents: 33 percent; assistant or associate academic vice presidents (or deans): 28 percent; presidents: 12 percent; and other: 27 percent.

Data from responding institutions were statistically adjusted to represent 2,623 four- and two-year colleges and universities. This adjustment means that the report's findings can be interpreted as generally representative of all two-year and four-year colleges and universities across the country. The technical notes (see Appendix B) contain a description of the stratification design, the weighting methodology and a comparison of respondents and nonrespondents.

FINDINGS

During 1984–1985, the nation's colleges and universities were the focus of several national reports calling for curricular reform. This survey shows that these reports have not gone unheeded: indeed, campus administrators can identify a variety of topics on which changes are being discussed. Especially notable is the evidence of strong interest in ways to assess student learning. The survey also documents that, apart from the reports, a widespread process of curricular review and change is taking place on the nation's campuses.

Other survey results make it clear that college administrators are beset with some basic challenges in the mid-1980s, including shifts in enrollment, low faculty compensation, changing program needs, poor preparation levels of entering students, and pressures to maintain adequate library and computer resources to support their academic programs.

Detailed tables appear at the end of the text.

Response to National Reports

Survey results document that the recent national reports on higher education are being discussed quite widely on the nation's college campuses. Such discussions have most often involved faculty and senior administrators; in some instances, they have included a college's board of trustees (see Table 1). As of summer 1985, 6 in 10 institutions reported discussions among senior administrators, 45 percent reported discussions in faculty meetings, and 24 percent reported discussions of the reports in meetings of their boards.

This survey captured early responses, certainly, but it suggests that the various reports may have significant impact. About 1 in 4 institutions reported that changes are being discussed in response to the reports. Others—ranging up to half of institutions—said that some recommended practices are already in place (see Table 2).

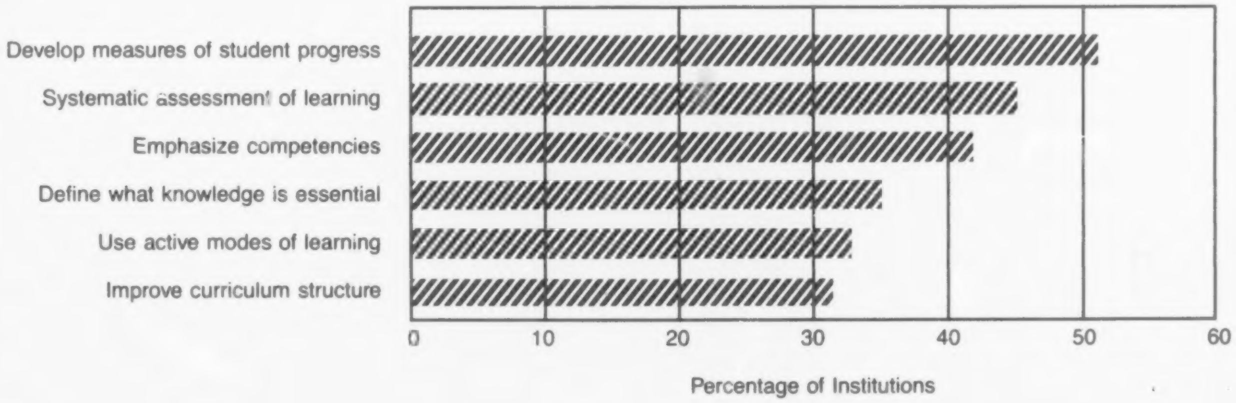
Figure 1 summarizes the recommendations receiving the most attention from the reports issued by the National Endowment for the Humanities, the Association of American Colleges, and the National Institute of Education. Two related themes are drawing the greatest attention: the need to measure student learning and to emphasize the competencies that students should gain through their studies. Two AAC recommendations—to prepare graduate students for teaching and to give equal importance to teaching and research in evaluating faculty—have received considerable attention by universities (see Table 2).

Notably, a good many institutions reported that they already have in place several of the recommended practices (Table 2). More than half already have their best faculty teach core courses, for example, and close to half give major emphasis to the freshman year.

The combination of responses—those actively considering a change and those already having appropriate practices—gives an indication of the likely contours of the college curriculum in the near future. Combining the two responses, for example, it can be seen that 82 percent of the nation's colleges and universities support a new emphasis on academic competencies and 73 percent agree on the importance of

FIGURE 1

Report Recommendations
Receiving the Most Discussion



well-defined statements of what knowledge is essential to an undergraduate education.

Baccalaureate colleges are notable for the major extent to which they already follow many of the recommendations. Thus, 7 in 10 baccalaureate colleges already require two years of liberal arts coursework, 2 in 3 have their best faculty teach core courses, and more than half give emphasis to freshman year experiences.

Among universities, about half already require two years of liberal arts for all students and already assign strong faculty to teach core courses. A good proportion of universities (17 percent and 27 percent, respectively) are discussing possible changes in these areas.

Although the recent reports have been criticized for neglecting the special circumstances of community colleges, survey responses show that certain recommendations are quite applicable. Thus, one in three community colleges reported that they already make systematic assessment of student learning and another 44 percent reported that this is being discussed. Close to half of the community colleges are discussing ways to emphasize analysis, communication and other competencies.

Table 2 also reports early reactions of four-year institutions to several recommendations about teacher education, issued by the National Commission for Excellence in Teacher Education in 1985. About one in four institutions are discussing ways to impose more rigorous admissions requirements; similar proportions are discussing ways to develop programs to attract minority students into teacher education. Baccalaureate colleges appear to be particularly responsive to the report's recommendation that teacher education be made a campus-wide responsibility: about one in five are discussing this recommendation, and about half already do so.

Changes in the Curriculum

Curricular change continues to occupy center stage on the nation's campuses. More than 80 percent of responding colleges and universities were currently reviewing the curriculum or had recently done so (see Table 3).

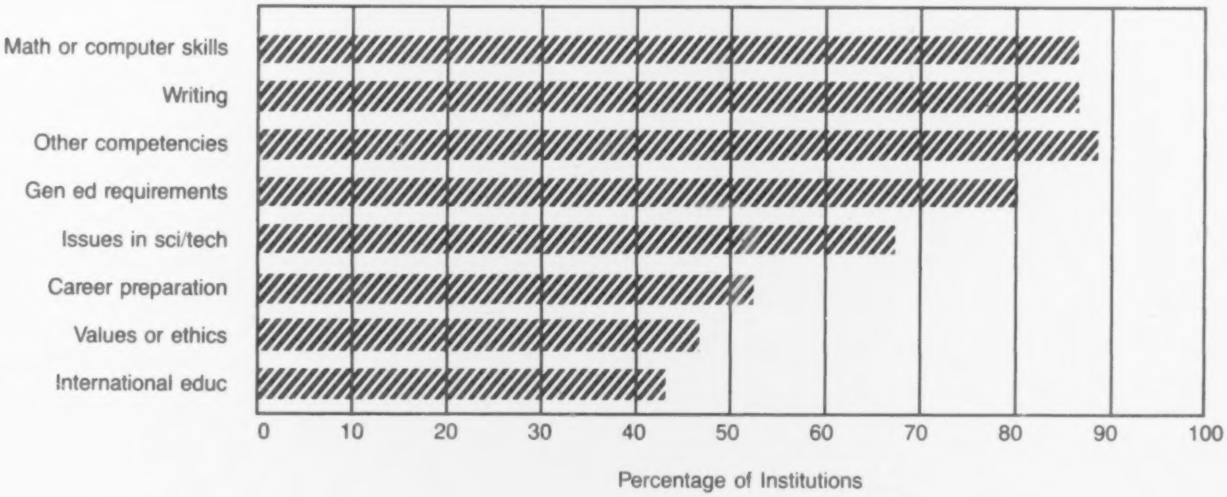
Receiving major emphasis in the reviews that are currently underway are the skills or competencies to be gained from college study (see Figure 2). Almost all of these reviews involved attention to mathematical or computer-related skills (86 percent), writing (86 percent) or such other competencies as communication and reasoning (88 percent).

General education requirements still occupied attention at most institutions (80 percent) although not as widely as last year (87 percent, as reported in *Campus Trends, 1984*). A new area of attention involves issues in science and technology: two-thirds of institutions reported that they currently are looking at such issues as they relate to the curriculum.

Some distinctive differences can be seen between two-year and four-year institutions (see table 3). Half or more of the four-year institutions are currently considering increased attention to international matters and foreign language study. There also is new attention to values or ethics: 61 percent of baccalaure-

FIGURE 2

Areas of Curricular Review, 1985
(Percent currently considering each topic)



ate colleges and 54 percent of universities reported this as a topic currently being discussed. Two-year institutions, in contrast, are giving greater emphasis to career preparation: 65 percent of the two-year institutions are considering ways to give greater curricular attention to career preparation, compared to 45 percent of baccalaurate colleges and 30 percent of universities.

Despite these differences, the general pattern is impressive: widespread review of the curriculum continues, with both two-year and four-year institutions giving special attention to the general education component of the curriculum and the skills or competencies that students should acquire through their studies.

Changes in Enrollment

Most of the information on enrollment changes among America's colleges and universities is reported either for the nation as a whole or for a particular institution. The national picture in recent years has been one of relative stability: overall enrollment from 1981 to 1984 has remained at about 12.4 million students.

The information shown in table 4 gives another view: this shows the pattern of change over the last four years by type of institution and by various characteristics of students. Two general observations seem appropriate:

First, despite little enrollment change in the aggregate, a good many colleges have experienced major changes in their enrollment. About 4 in 10 institutions reported significant changes over four years, a relatively short period of time for monitoring enrollment change. As expected, the most notable changes involved shifts away from full-time students and toward part-time and older students. Also striking is the evidence of significant increases in commuter students and foreign students, as reported by about one in five institutions.

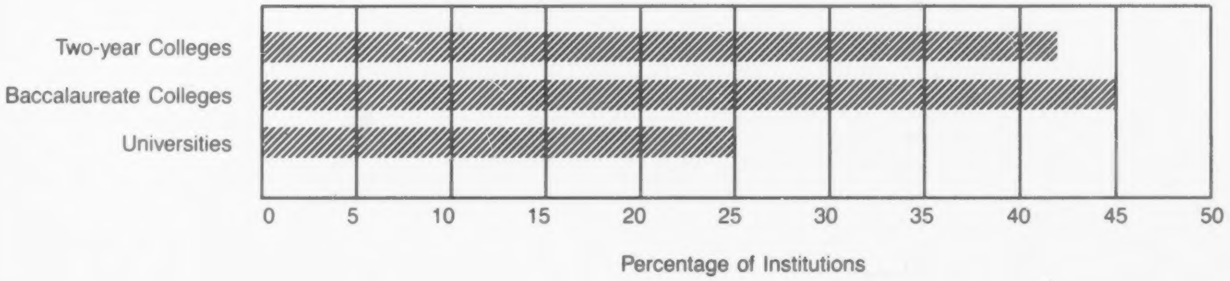
For baccalaureate colleges, the most striking change was in part-time students: close to half (45 percent) reported significant increases in part-time enrollment (see figure 3) and 33 percent reported significant increases in commuter students.

Second, American higher education remains remarkably diverse. For each student characteristic, some colleges reported net gains while others reported net decreases. Among two-year institutions, for example, where the dominant trends involve increasing part-time and older students, at least one-third of these institutions reported significant increases in full-time students over the past four years. So too, although 1 in 5 baccalaureate colleges and universities reported significant decreases in full-time students, as many as 32 percent of baccalaureate colleges and 25 percent of universities reported significant gains in full-time enrollment.

Interesting, too, in this regard, are the changes that were reported in the academic ability of entering students: although 12 percent of all institutions reported significant erosion, another 21 percent said they had experienced significant gains.

It is difficult to interpret the study's results regarding hispanic and black students (see table 4), in light of reports that minority enrollment has decreased recently. Results here show that a small proportion of institutions (14 percent) made gains in minority enrollment over the four-year period while only a few experienced decreases. Because the survey sought information for a four-year period, results may understate recent experience.

FIGURE 3
Colleges Reporting Increased
Part-time Enrollment
Over the Past Four Years



Changes in Faculty

The study's results regarding faculty hiring practices also reflect a diversity of experience among colleges and universities. Fully 21 percent of institutions reported a net loss in faculty positions compared to a year earlier. This represents a very sizeable decline. The contrast is also striking, however: 32 percent of colleges reported no change and almost half (48 percent) reported a net gain in faculty positions. These net gains were reported by higher percentages of baccalaureate colleges and universities than by two-year institutions (figure 4). This may reflect the special budgetary pressures felt by many two-year institutions recently.

Most colleges hired new faculty during 1984–1985, and were about as likely to hire faculty in term or contract positions as in tenure-track positions (see Table 5). There also is an extensive use of part-time faculty: 39 percent of institutions reported that part-time faculty were used in more than one-fourth of courses. This was true of only 24 percent of baccalaureate colleges and 22 percent of universities, however, in contrast to 55 percent of two-year colleges.

About 1 in 4 institutions reported that they had retrenchment procedures underway to cut back on the number of faculty (see Table 5). As another strategy, close to half of the institutions said they had procedures to retrain faculty for changing program needs; this was especially typical at two-year institutions (reported by 52 percent), compared to baccalaureate colleges (29 percent) and universities (42 percent).

Table 6 reflects changes in the profile of faculty due to the cumulative impact of hiring practices over the past five years. Part-time faculty have increased, especially at two-year institutions. Some increases in full-time faculty are also noted, more so at baccalaureate colleges than at other types of institutions.

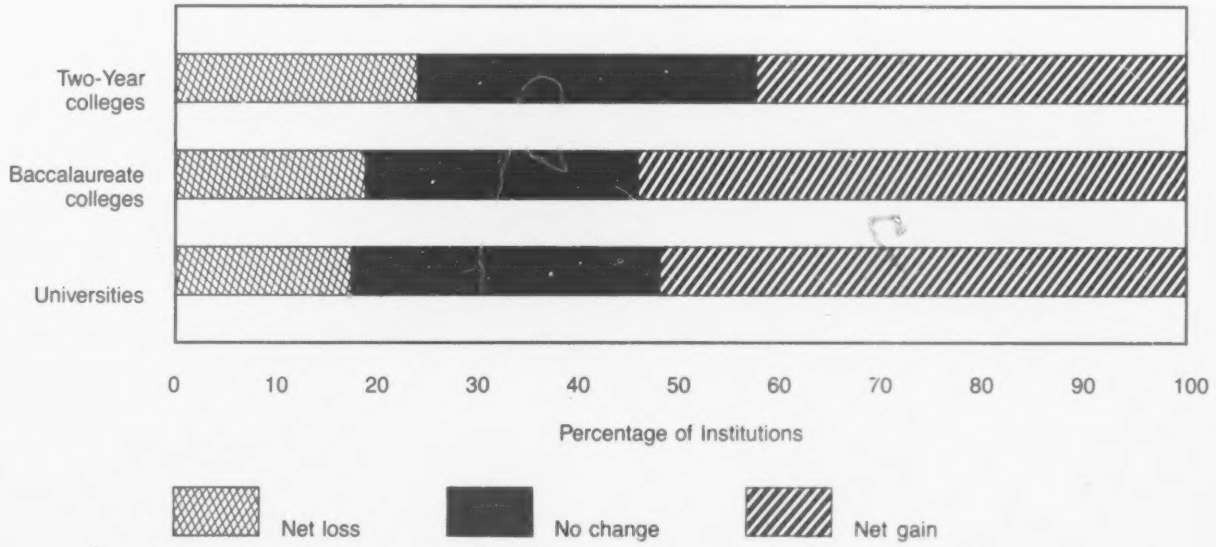
Notably, about 1 in 5 institutions reported gains in the representation of women faculty during the last five years (see Table 6). However, very modest progress was reported in improving the percentage of minority faculty: only 12 percent of institutions reported any gains. In fact, the figures for baccalaureate colleges show almost as much erosion in the representation of minority faculty (5 percent) as gain (8 percent) during the last five years.

In view of the rising average age of college faculty today, there has been concern that older faculty will be reluctant to retire and, in particular, will increasingly opt to stay on until age 70 or beyond. This survey suggests that there has been no significant change in this regard as of mid-decade: only 6 percent of institutions reported an increase in the number of faculty over the age of 65; another 7 percent of institutions reported a significant decrease in the percentage of their faculty who are over 65. It can be noted, however, that 10 percent of universities reported a significant increase in the number of faculty over 65.

Table 7 shows expected changes in faculty over the next five years, differentiated by broad subject areas.

FIGURE 4

Change in Faculty Positions
Compared to a Year Earlier



A predictable pattern emerges: more than half of the nation's colleges and universities expect to see significant increases in their faculty in computer and information sciences (including 73 percent of universities), and about 4 in 10 expect significant increases in business faculty. Notably, half of baccalaureate colleges expect an increase in business faculty, a proportion that is higher than that given by other institutions.

Relatively few other subject areas are mentioned as likely to experience significant faculty growth. This may reflect the difficulties of making such predictions by subject area. Two other areas—engineering and mathematical sciences—were mentioned by more than one-quarter of universities. Vocational-technical fields were mentioned by about 3 in 10 two-year institutions. The health professions were mentioned by 16 percent of institutions.

Administrative Policies and Practices

Figure 5 summarizes responses regarding a number of administrative practices used by academic institutions today. The survey findings attest to a general move on the nation's campuses toward systematic planning and procedures. Thus, as of 1985, almost all of the nation's colleges and universities have procedures in place for long-range planning (87 percent) and for program review (83 percent). Regular monitoring of student attrition is also widespread (86 percent). More than half of the institutions have also developed procedures for systematic faculty planning, which may involve analysis of expected changes in faculty hiring, tenure rates, retirements, or other matters.

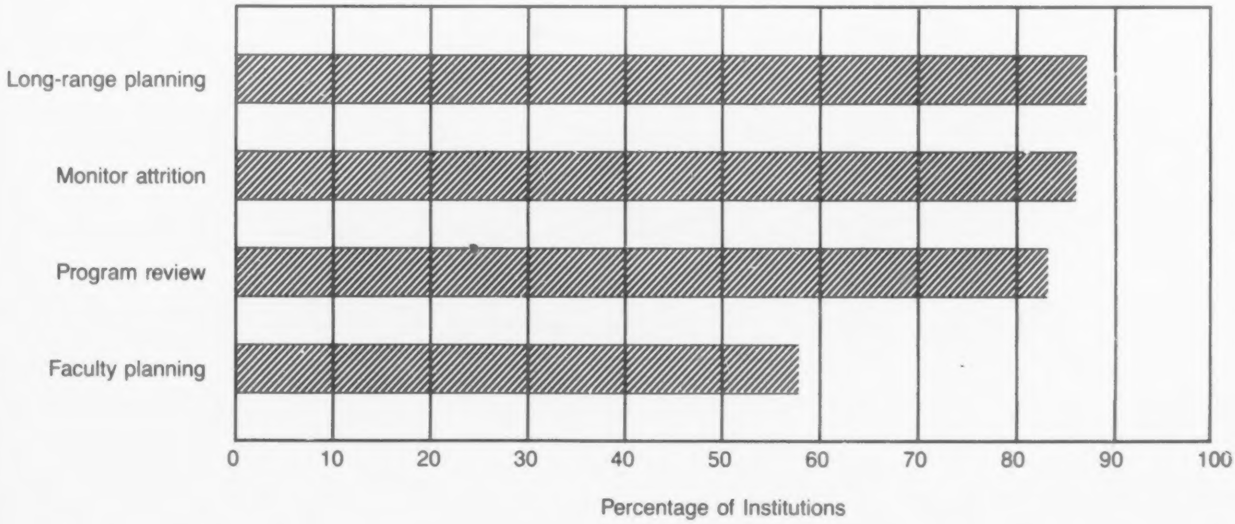
Notably, close to half of the nation's colleges and universities have at some time completed an analysis of the economic impact of their institution on their state or surrounding community (see Table 8). This was particularly so for universities (57 percent) and two-year institutions (45 percent) and less true of baccalaureate colleges (37 percent did so).

Campus use of personal computers appears to be growing. As Table 8 shows, close to half of colleges and universities now offer writing courses that are based on microcomputer use. In contrast, very few institutions—5 percent, overall—require all students to have microcomputers.

Questions were also asked about current practices in making appointments in academic administration. As Table 9 shows, about half of the institutions appoint their academic deans or provosts to a stated term of appointment, usually involving one year. Almost all such positions are subject to formal performance evaluation. About half of the institutions offer sabbatical leave for such positions.

There were differences across institutions on the issue of whether tenure can be granted when persons new to the institution were appointed as academic dean or provost. Among universities, more than half

FIGURE 5
Administrative Practices of
Colleges and Universities, 1985



(55 percent) have such a practice. In contrast, only 1 in 10 baccalaureate colleges or two-year colleges have such a practice.

Ties with Business and Industry

Among the nation's colleges and universities, almost all have formal links with the corporate community (see Table 10). Fully 85 percent of these institutions have joint meetings or advisory panels that include corporate officials. Most (75 percent) also have programs by which equipment is loaned, donated or shared between the college and corporations. Scholarship or loan programs were another very typical form of collaboration, reported by 63 percent of colleges and universities. Also, 65 percent of the universities reported that they received financial support from business and industry for research.

A substantial degree of activity also takes place in other, less traditional modes of cooperation. As figure 6 shows, about two-thirds of these institutions offered courses for business employees on company premises; this practice is especially strong at two-year institutions. Jointly developed degree or certificate programs are also offered at a significant number of colleges: 49 percent of two-year institutions had such programs, as did 34 percent of baccalaureate colleges and 21 percent of universities.

Questions were also asked about collegiate participation in partnerships involving the business community (see Table 10). Close to half of the institutions reported participation in such partnerships to foster state or regional economic development; this was especially true of two-year institutions and universities. About 4 in 10 of these institutions reported that they were active in partnerships with the business community to assist the high schools in their area.

Opinions on Institutional Status

The survey also included several questions asking about the direction of each college's experience on a variety of student, faculty and other matters. Taken together, these responses offer a general view of the institution's status. While the responses are the opinions of academic administrators and probably not based on precise information, they nevertheless offer a valuable benchmark for assessing certain issues affecting higher education today.

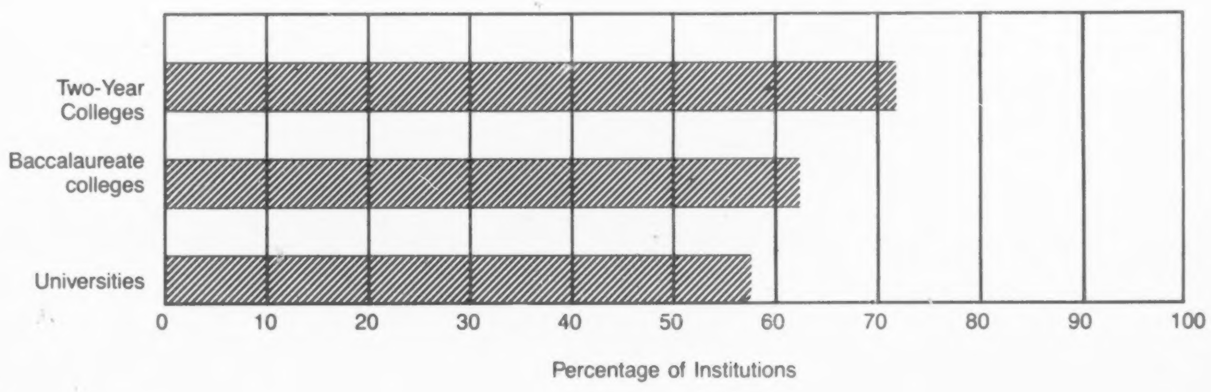
The results are summarized in Table 11. Most significant, perhaps, are the areas where large percentages of colleges and universities reported improvements. These include:

	Percent with gains
• Adequacy of academic computer equipment	83 percent
• Ability to attract good students	59 percent
• Job prospects for degree recipients	55 percent
• Ability to serve disabled students	54 percent

Improvements in the availability of academic computer equipment appear to be the most widespread. Similar percentages reported such improvements across types of institutions. Improvements in the abil-

FIGURE 6

Colleges Offering Credit Courses on Business Premises, 1985



ity to serve disabled students are also notable, although baccalaureate colleges appear to trail behind other types of academic institutions.

Improvements in a college's ability to attract good students were reported rather uniformly across institutions. In view of the continuing problems that occur with the weak preparation levels of entering students (as mentioned below), it is possible that responses on this question reflect administrative improvements in recruiting students as much as they reflect actual changes in the qualifications of entering students.

The areas where the *fewest* institutions reported improvements are also worth highlighting:

	Percent with gains
• General preparation level of entering students	31 percent
• Ability to attract minority students	33 percent
• Adequacy of library resources	38 percent
• Adequacy of student aid	40 percent

For each of these areas, between 8 percent and 17 percent of institutions also reported that their circumstances were significantly worse today compared to several years ago.

Faculty compensation is another area in which results are troubling: only 45 percent of institutions reported that the level of faculty compensation was better today than several years ago (see Table 11). Another 15 percent reported that faculty compensation was worse and the others—fully 40 percent of institutions—reported no change. In view of the fact that levels of faculty compensation have not kept up with inflation throughout the last decade, the inability of most institutions to make improvements in this area should be cause for serious concern. This problem appears to be particularly acute among baccalaureate colleges, where only 36 percent reported any improvement and 16 percent said that faculty compensation was worse than several years ago.

Summary

This survey of current policies and practices in academe offers a mixed picture: campuses are giving major attention to curriculum reform, expect growing activity in engineering, business and computer-related areas, and have increasingly widespread ties with business and industry. Colleges and universities have taken a number of steps to manage their internal operations wisely in a time of difficult budgetary constraints: long-range planning, monitoring of student attrition, and program review have become common practice. Part-time faculty and nontenured, term appointments have been used rather widely, apparently to gain staffing flexibility. A good number of colleges and universities have also developed programs to retrain faculty in response to changing program needs.

Several problems continue to be of concern, a major one being the weak levels of preparation of entering students. Problems in attracting minority students appear to be a growing concern. Financial problems also remain, especially with regard to faculty compensation, library resources, and student aid.

The nation's colleges and universities will be trying to meet these challenges throughout the rest of this decade. It is hoped that the series of Campus Trends surveys, to be repeated annually, will help document the changes that will be taking place.

DETAILED STATISTICAL TABLES

Readers should note that some percentage distributions in the following tables may not total to 100 because of weighting and rounding.

TABLE 1—College Actions on National Reports
(Percentages)

Population N:	Two-year colleges 1311		Baccalaureate colleges 739		Universities 573		All 2623	
	Yes	Planned	Yes	Planned	Yes	Planned	Yes	Planned
Task force/committee review	21	6	31	16	30	7	26	9
Discussion of the reports:								
In faculty meetings	40	8	51	17	51	11	45	11
Among senior administrators	55	10	72	5	67	13	62	9
With the board of trustees	22	10	26	9	25	8	24	10
In special meetings	21	11	34	12	29	14	26	12
Changes in academic programs	30	28	26	27	24	27	28	27
Changes in student services	30	21	18	25	15	21	23	22
Changes in research/assessment	29	28	15	28	15	32	22	29

TABLE 2—Responses to Recommendations of National Reports
(Percentages)

Population N:	Two-year Colleges 1311		Baccalaureate Colleges 739		Universities 573		All 2623	
	In Place	Under Discussion	In Place	Under Discussion	In Place	Under Discussion	In Place	Under Discussion
NIE:								
Emphasize the freshman year	46	10	56	28	38	37	47	21
Emphasize analysis, communications	35	44	45	40	47	38	40	42
Use active modes of learning	36	32	33	34	23	30	32	33
Make systematic assessment	33	44	26	47	20	44	28	45
Require two years of liberal arts	7	7	71	6	51	17	35	9
AAC:								
Improve curriculum structure	35	33	30	32	26	27	32	32
Deemphasize & change the major	3	15	8	17	2	14	4	15
Prepare grad sts. for coll. teach	0	0	3	8	16	14	4	7
Develop measures of progress	20	51	16	53	14	48	18	51
Give importance to teaching/research	10	9	37	11	43	27	25	13
NEH:								
Give humanities a central place	26	22	55	8	48	27	39	19
Define knowledge that is essential	33	34	44	36	40	36	38	35
Use original texts in humanities	17	17	35	15	42	13	27	15
Have best faculty teach core courses	53	13	66	17	52	27	57	17
Integrated humanities sequence	18	30	27	24	31	37	23	30
NCETE:								
Impose rigorous admission req.	0	0	48	25	57	22	26	12
Develop minority recruitment programs	0	0	5	19	28	22	7	10
Develop experimental teacher pgms	0	0	8	24	25	27	8	13
Assign sufficient resources	0	0	58	12	52	23	28	8
Make it campus-wide responsibility	0	0	46	19	44	17	23	9

TABLE 3—Experiences with Curriculum Review
(Percentages)

	Two-Year Colleges	Baccalaureate Colleges	Universities	All
Currently Reviewing	51	50	40	48
Recently completed	30	30	44	33
Current or recent review:				
New general education requirements	75	92	90	83
Greater emphasis on writing	79	87	87	83
Greater emphasis on other requirements	83	90	81	85
Increase in course requirements	44	56	51	49
Greater flexibility for adult learners	44	37	28	39
Attention to international matters	21	58	62	40
New attention to foreign language study	23	51	48	37
New attention to issues in science/tech	62	77	65	67
Greater attention to career preparation	63	45	29	50
Emphasis on math-related skills	88	88	80	86
More multidisciplinary courses	36	44	53	42
New attention to values or ethics	37	61	47	46
New approaches to teacher education	22	42	46	33
Currently underway:				
New general education requirements	71	93	88	80
Greater emphasis on writing	83	87	92	86
Greater emphasis on other requirements	88	93	82	88
Increase in course requirements	38	52	43	43
Greater flexibility for adult learners	47	37	32	41
Attention to international matters	28	57	65	43
New attention to foreign language study	26	61	53	41
New attention to issues in science/tech	59	77	70	67
Greater attention to career preparation	65	45	30	53
Emphasis on math-related skills	87	87	83	86
More multidisciplinary courses	40	35	56	41
New attention to values or ethics	35	61	54	46
New approaches to teacher education	19	45	50	32
Recently completed:				
New general education requirements	83	90	91	87
Greater emphasis on writing	71	88	81	78
Greater emphasis on other requirements	74	87	81	79
Increase in course requirements	55	62	58	58
Greater flexibility for adult learners	41	38	24	35
Attention to international matters	9	59	59	36
New attention to foreign language study	18	34	44	30
New attention to issues in science/tech	66	75	61	67
Greater attention to career preparation	59	46	29	47
Emphasis on math-related skills	90	90	77	86
More multidisciplinary courses	31	60	50	44
New attention to values or ethics	40	61	42	46
New approaches to teacher education	27	37	43	34

TABLE 4—Changes in Enrollment Over the Past Four Years
(Percentage of institutions reporting each change*)

	Two-Year Colleges		Baccalaureate Colleges		Universities		All	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
Full-time students	34	36	32	22	25	20	31	29
Part-time students	42	17	45	5	25	13	39	13
Black students	12	8	17	7	14	8	14	8
Hispanic students	17	1	11	2	11	2	14	2
Commuter students	22	5	33	3	10	5	23	5
Out of state students	12	8	11	9	14	7	12	8
Foreign students	14	17	20	12	22	9	18	14
Median age of students	37	2	29	0	16	5	30	2
Academic ability of students	18	16	21	8	28	6	21	12
Family ability to pay	5	18	5	17	5	15	5	17
Average class size	9	21	12	8	9	11	10	15

*Percentages for "no change" are not shown.

TABLE 5—Faculty Policies and Practices
(Percentages)

	Two-Year Colleges	Baccalaureate Colleges	Universities	All
Full-time faculty were hired in:				
Tenure-track positions	48	77	97	67
Term or contract positions	69	62	84	70
Faculty positions (84–85 compared to 83–84)				
A net loss	24	18	17	21
A net gain	42	54	52	48
No change	34	28	31	32
Extensive use of part-time faculty	55	24	22	39
Procedures to retrain faculty	52	29	42	43
Retrenchment procedures underway	31	23	26	28

TABLE 6—Changes in Faculty Over the Past Five Years
(Percentages)

	Two-Year Colleges		Baccalaureate Colleges		Universities		All	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
Size of full-time faculty	21	18	34	13	24	9	26	15
Size of part-time faculty	33	11	30	11	17	7	29	10
Percent of faculty awarded tenure	5	4	7	13	4	9	5	8
Percent of faculty, non-tenure track	5	2	10	5	14	3	9	3
Percent of women faculty	19	1	25	1	29	1	23	1
Percent of minority faculty	14	2	8	5	12	2	12	3
Number of faculty over 65	4	7	6	5	10	9	6	7

TABLE 7—Expected Changes in Faculty in the Next Five Years
(Percentages)

	Two-Year Colleges		Baccalaureate Colleges		Universities		All	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
Arts and humanities	11	7	11	6	9	9	11	7
Foreign languages	10	9	13	4	8	5	10	7
Social sciences	2	10	5	5	7	6	4	8
Biological and physical sciences	13	3	13	0	17	3	14	2
Computer/information science	55	1	55	0	73	0	59	0
Engineering (except computer sci)	19	2	10	0	28	0	18	1
Mathematical sciences	16	2	18	0	26	0	19	1
Health professions	17	8	16	4	15	3	16	6
Business	38	1	50	0	37	3	41	1
Teacher education	3	2	16	3	16	10	10	4
Vocational-technical fields	29	2	8	8	5	11	18	6

TABLE 8—Administrative Policies and Practices
(Percentages)

	Two-Year Colleges	Baccalaureate Colleges	Universities	All
Institution has:				
Long-range planning	87	89	88	87
Program review	85	81	82	83
Systematic faculty planning	54	58	67	58
Collective bargaining agreement	34	5	22	23
Regular monitoring of student attrition	85	84	91	86
Foundation funds for undergrad. programs	37	44	53	43
Analysis of the inst. econ. impact	45	37	57	46
A budgeted position for improvement	34	18	35	30
Writing courses with microcomputers	43	41	47	43
PC's required for all students	7	3	3	5

TABLE 9—Policies for Academic Administrators
(Percentages)

	Two-Year Colleges	Baccalaureate Colleges	Universities	All
Appointments for deans or provosts generally have a stated term:	52	52	45	51
Term is one year	86	78	50	77
Term is two or three years	10	14	22	13
Term is four years or more	4	7	28	10
Tenure can be granted	10	12	55	21
Formal performance evaluation	92	79	86	87
Sabbatical leave is offered	49	48	56	50
Budget for development	77	55	44	64

TABLE 10—Ties with Business and Industry

(Percentages)

Total with formal ties:	Two-Year Colleges 1077	Baccalaureate Colleges 400	Universities 457	All 1933
Formal ties with business/industry in:				
Shared or on-loan staff	22	33	37	28
Equipment donated, loaned, or shared	77	60	82	75
Credit courses for business employees	72	63	58	67
Noncredit courses for bus. employees	73	43	60	64
Scholarship or loan programs	63	59	67	63
Joint meetings or advisory panels	87	83	83	85
Jointly developed & sponsored programs	49	34	21	39
Partnerships to assist high schools	42	33	38	39
Partnerships for state/reg development	50	25	46	44
Financial support of research	7	21	65	23
Formal ties with bus./industry, planned:				
Shared or on-loan staff	16	14	11	14
Equipment donated, loaned, or shared	6	5	3	5
Credit courses for busin. employees	6	12	10	8
Noncredit courses for bus. employees	5	22	8	9
Scholarship or loan programs	1	14	6	5
Joint meetings or advisory panels	2	7	3	3
Jointly developed & sponsored programs	11	17	10	12
Partnerships to assist high schools	13	21	18	15
Partnerships for state/reg develpmt	10	16	18	13
Financial support of research	7	16	8	9

TABLE 11—Administrator Views on Recent Institutional Changes

(Percentages*)

	Two-Year Colleges		Baccalaureate Colleges		Universities		All	
	Better	Worse	Better	Worse	Better	Worse	Better	Worse
Ability to attract good students	57	8	58	5	64	4	59	6
Ability to attract minority students	32	5	30	14	37	8	33	8
Preparation of entering students	22	22	41	12	38	15	31	17
Ability to serve disabled students	57	2	46	7	60	0	54	3
Job prospects for degree recipients	50	4	56	2	66	0	55	3
Ability to attract good faculty	49	8	48	6	52	6	49	7
Overall faculty morale	51	12	52	10	42	13	49	12
Faculty-admin. communications	44	4	54	6	46	8	47	6
Adequacy of faculty compensation	49	13	36	16	48	16	45	15
Adequacy of student aid	39	7	40	15	43	13	40	11
Ability to respond to enrollmt. shifts	48	6	43	2	41	6	45	5
Academic computer equipment	82	4	86	4	84	4	83	4
Other equip. for teaching/research	36	6	44	7	50	20	41	9
Adequacy of library resources	30	8	46	5	45	11	38	8

*Percentages for "no change" are not shown.

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

May 30, 1985

Dear Higher Education Panel Representative:

Attached is Higher Education Panel Survey No. 71, sponsored by the American Council on Education. This is the second in a series of annual surveys designed to obtain general information on campus trends. The questionnaire elicits information on recent or pending changes in a variety of institutional policies and practices affecting faculty, the curriculum, and other areas.

This questionnaire does not seek numerical responses. It asks general questions or seeks opinions about changes in academic policies. The survey should be completed by the academic vice president or, if that is not possible, by another high-level official with a broad view of the institution.

Please understand that your institution's responses will be held in strict confidence. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identified with your institution.

Please return the completed questionnaire by July 15, 1985. A preaddressed envelope is enclosed for your convenience. If you have any questions or problems, please do not hesitate to telephone us collect at 202/833-4757.

Sincerely,

Elaine El-Khawas

Elaine El-Khawas
Acting Panel Director

Attachment

One Dupont Circle, Washington, D.C. 20036-1193 (202) 833-4757

AMERICAN
COUNCIL ON
EDUCATION

Higher Education Panel Survey Number 71

CAMPUS TRENDS 1984-85

You will note that this questionnaire does not seek numerical responses; it asks a series of general questions and seeks your opinions about policies and practices at your institution. Please answer the following questions with respect to 1984-1985.

I. CURRICULUM

A. Is a general review of curriculum underway or has one recently been completed?

☐ No
☐ Yes, currently underway
☐ Yes, completed within the last few years

If "yes" does it include:

	Yes	No
1. New general education requirements	☐	☐
2. Greater emphasis on writing	☐	☐
3. Greater emphasis on other competencies (communication, reasoning, etc.)	☐	☐
4. An increase in course requirements	☐	☐
5. Greater flexibility for adult learners	☐	☐
6. Increased attention to international matters	☐	☐
7. New attention to foreign language study	☐	☐
8. New attention to issues in science and technology	☐	☐
9. Greater attention to career preparation	☐	☐
10. Greater emphasis on mathematical or computer-related skills	☐	☐
11. More multidisciplinary or "theme" courses	☐	☐
12. New attention to values or ethics	☐	☐
13. New approaches to teacher education	☐	☐

B. Several national reports have called for changes in undergraduate education. Is your institution following any of the recommendations listed below?

From NIE's Involvement in Learning:	Already In Place	Under Discussion	No
1. Emphasize the freshman year	☐	☐	☐
2. Emphasize analysis, communication, synthesis and problem solving	☐	☐	☐
3. Use "active" modes of learning	☐	☐	☐
4. Make systematic assessment of student learning	☐	☐	☐
5. Require two years of liberal arts courses for all bachelor's degrees	☐	☐	☐
From AAC's Integrity in the Classroom:			
1. Improve curriculum structure by stressing areas of instruction	☐	☐	☐
2. Deemphasize and change the academic major	☐	☐	☐
3. Prepare graduate students for college teaching	☐	☐	☐
4. Develop better measures of student progress	☐	☐	☐
5. Give equal importance to teaching and research for faculty	☐	☐	☐

From NEH's To Reclaim a Legacy:	Already In Place	Under Discussion	No
1. Give humanities and Western civilization a central place in the curriculum	☐	☐	☐
2. Make a clear statement of what knowledge is essential to a good education	☐	☐	☐
3. Use original texts in humanities courses	☐	☐	☐
4. Have the best faculty teach core courses	☐	☐	☐
5. Develop an integrated sequence of humanities courses	☐	☐	☐
From NCETE's A Call for Change in Teacher Education:			
1. Impose rigorous admission and graduation standards for teacher education programs	☐	☐	☐
2. Develop special minority recruitment programs in teacher education	☐	☐	☐
3. Develop experimental teacher education programs	☐	☐	☐
4. Assign sufficient resources to teacher education	☐	☐	☐
5. Make teacher education a campus-wide responsibility	☐	☐	☐

C. Has the reaction to the reports at your institution included any of the following?

	Yes	Planned	No
1. Task force or committee to review the report(s)	☐	☐	☐
2. Discussion of the reports:			
a. in faculty meetings	☐	☐	☐
b. among senior administrators	☐	☐	☐
c. with the board of trustees	☐	☐	☐
d. in specially convened meetings	☐	☐	☐
3. Changes in academic programs	☐	☐	☐
4. Changes in student services	☐	☐	☐
5. Changes in research and assessment of students	☐	☐	☐

Continued next page

II. FACULTY

	Yes	No
A. Were any new full-time academic hired in academic year 1984-85 in:		
1. tenure-track positions	☐	☐
2. term or contract positions	☐	☐

B. Compared to a year earlier, was there:

☐ A net loss in faculty positions
☐ A net gain in faculty positions
☐ No change in faculty positions

	Yes	No
C. Was extensive use made of part-time faculty (i.e., for more than about one-fourth of courses)?	☐	☐
D. Do you have procedures to retrain faculty for changing program needs?	☐	☐
E. Do you have retrenchment procedures underway (to cut back on the number of faculty)?	☐	☐

F. How has your institution changed over the past five years in the:

	Significant Increase	No Significant Change	Significant Decrease
1. Size of full-time faculty	☐	☐	☐
2. Size of part-time faculty	☐	☐	☐
3. Percentage of eligible faculty being awarded tenure	☐	☐	☐
4. Percentage of faculty on non-tenure track contracts	☐	☐	☐
5. Percentage of full-time faculty that are women	☐	☐	☐
6. Percentage of full-time faculty that are minorities	☐	☐	☐
7. Number of full-time faculty continuing beyond age 65	☐	☐	☐

G. What changes do you expect in the next five years in the number of faculty in:

	Significant Increase	No Significant Change	Significant Decrease
1. Arts and humanities	☐	☐	☐
2. Foreign languages	☐	☐	☐
3. Social sciences	☐	☐	☐
4. Biological and physical sciences	☐	☐	☐
5. Computer science or information science	☐	☐	☐
6. Engineering (exclusive of computer science)	☐	☐	☐
7. Mathematical sciences	☐	☐	☐
8. Health professions	☐	☐	☐
9. Business	☐	☐	☐
10. Teacher education	☐	☐	☐
11. Vocational-technical fields	☐	☐	☐

III. ENROLLMENT

How has your institution's enrollment changed over the past four years regarding:

	Significant Increase	No Significant Change	Significant Decrease
1. Full-time students	☐	☐	☐
2. Part-time students	☐	☐	☐
3. Black students	☐	☐	☐
4. Hispanic students	☐	☐	☐
5. Commuter students	☐	☐	☐
6. Out-of-state students	☐	☐	☐
7. Foreign students	☐	☐	☐
8. Median age of students	☐	☐	☐
9. Academic ability of students	☐	☐	☐
10. Family ability to pay	☐	☐	☐
11. Average class size	☐	☐	☐

IV. ADMINISTRATIVE PRACTICES AND PLANNING

A. For academic administrative appointments (e.g. dean, provost), does your institution generally:

	Yes	No
1. Make appointments with a stated term	☐	☐
If yes, term is: ☐ one year ☐ two or three years ☐ four years or more		
2. Allow tenure to be granted on appointments of persons new to the institution	☐	☐
3. Periodically conduct a formal performance evaluation	☐	☐
4. Offer sabbatical leaves	☐	☐
5. Have a budget to support professional development of administrators	☐	☐

B. Does your institution have:

	Yes	No
1. An ongoing long-range planning activity	☐	☐
2. An ongoing formal process of program review	☐	☐
3. Procedures for systematic faculty planning (that looks to expected changes in hiring, tenure rates, retirements, etc.)	☐	☐
4. A collective bargaining agreement covering the faculty	☐	☐
5. Regular monitoring of student attrition rates	☐	☐
6. Foundation funds to improve undergraduate education	☐	☐
7. An analysis of the institution's economic impact on its state or community	☐	☐
8. A budgeted position (at least half-time) devoted to instructional improvement	☐	☐
9. Writing courses taught with microcomputers	☐	☐
10. A requirement that all students have microcomputers	☐	☐

Continued next page

V. BUSINESS & INDUSTRY

A. Does your institution have formal ties with business or industry in your area?

☐ Yes
☐ No

If "yes," do these involve:

	Yes	Planned	No
1. Shared or on-loan staff)	☐	☐	☐
2. Equipment (donations, loans, or shared use)	☐	☐	☐
3. Credit courses for business employees at business locations	☐	☐	☐
4. Noncredit courses for business employees at business locations	☐	☐	☐
5. Scholarship or loan programs	☐	☐	☐
6. Joint meetings or advisory panels	☐	☐	☐
7. Jointly developed and sponsored degree (or certificate) programs	☐	☐	☐
8. Partnerships designed to assist high schools	☐	☐	☐
9. Partnerships for state or regional economic development	☐	☐	☐
10. Corporate financial support of research	☐	☐	☐

VI. OPINIONS OF CHANGE

A. Compared to several years ago, how would you rate the following?

	Better	Same	Worse
1. Ability of your institution to attract good students	☐	☐	☐
2. Ability of your institution to attract minority students	☐	☐	☐
3. General level of preparation of your institution's entering students	☐	☐	☐
4. Ability of your institution to meet the needs of disabled students	☐	☐	☐
5. Job prospects for this year's degree recipients from your institution	☐	☐	☐
6. Ability of your institution to attract and hold good faculty	☐	☐	☐
7. Overall level of faculty morale at your institution	☐	☐	☐
8. Quality of faculty-administrator communications	☐	☐	☐
9. Adequacy of faculty compensation at your institution	☐	☐	☐
10. Adequacy of student aid provided by your institution, including scholarships, fellowships, and loans	☐	☐	☐
11. Ability of your institution to respond to enrollment shifts	☐	☐	☐
12. Adequacy of academic computer equipment	☐	☐	☐
13. Adequacy of other equipment for teaching and research	☐	☐	☐
14. Adequacy of library resources at your institution	☐	☐	☐

Thank you for your cooperation.

Please return this form by **July 15, 1985,** to:

Higher Education Panel
American Council on Education
One Dupont Circle, N.W.
Washington D.C. 20036

Please keep a copy of this survey for your records.

Name of Respondent ______________________

Title ______________________

Department ______________________

Telephone (____) ______________________

If you have any questions concerning this survey, please call the HEP staff collect at (202) 833-4757.

APPENDIX B: TECHNICAL NOTES

Data from the responding Panel institutions were statistically adjusted to represent all of the nation's colleges and universities except specialized and religious institutions (such as rabbinical seminaries). The stratification design for weighting follows.

The weighting technique used was the standard one employed for Panel surveys. Data received from Panel members were adjusted for item and institutional nonresponse within each cell. Then institutional weights were applied to bring the Panel data up to estimates that are representative of the national population.

Table B-2 compares survey respondents and nonrespondents against several variables. Response rates were generally even across institutions. Higher-than-average response rates were recorded for private baccalaureate institutions. Response rates for public baccalaureate colleges and private universities were somewhat lower than average.

TABLE B-1:—Stratification Design

Cell	Type of Institution	Enrollment	Population	Respondents
	Total		2,623	398
1	Large public doctorate-granting	a	104	47
2	Large private doctorate-granting	a	60	20
3	Large public comprehensive	a	92	39
4	Large private comprehensive	a	27	11
7	Large public two-year	a	43	19
8	Public comprehensive	5,500–8,999	56	17
9	Public comprehensive	<5,500	108	21
10	Private comprehensive	<9,000	126	21
11	Public baccalaureate	<9,000	127	17
12	Private baccalaureate	1,350–8,999	166	26
13	Private baccalaureate	<1,350	446	32
17	Public 2-year academic/comprehensive	6,000–8,999	55	16
18	Public 2-year academic/comprehensive	4,000–5,999	72	17
19	Public 2-year academic/comprehensive	2,000–3,999	155	21
20	Public 2-year academic/comprehensive	<2,000	333	23
21	Private 2-year academic/comprehensive	<9,000	129	12
22	Public two-year occupational	2,500–8,999	63	15
23	Public two-year occupational	<2,500	221	16
24	Private two-year occupational	<9,000	240	8

[a] Institutions that meet one or more of the three following criteria: (a) total full-time equivalent (FTE) 1981 enrollment greater than 8,999; (b) FTE 1981 graduate enrollment greater than 749; (c) FY 1979 educational and general expenditures of $35 million or more.

TABLE B-2:—Comparison of Respondents and Nonrespondents
(In percentages)

Control and Type of Institution	Respondents (N = 398)	Nonrespondents (N = 70)	Response Rate
Total	100.0	100.0	85.0
Control			
Public	67.3	59.3	88.4
Private	32.7	40.7	84.4
Type and Control			
Public University	31.2	23.7	89.9
Private University	13.1	23.7	78.8
Public Baccalaureate	4.3	8.5	77.3
Private Baccalaureate	14.6	10.2	90.6
Public Two-Year	31.9	27.1	88.8
Private Two-Year	5.0	6.8	83.3

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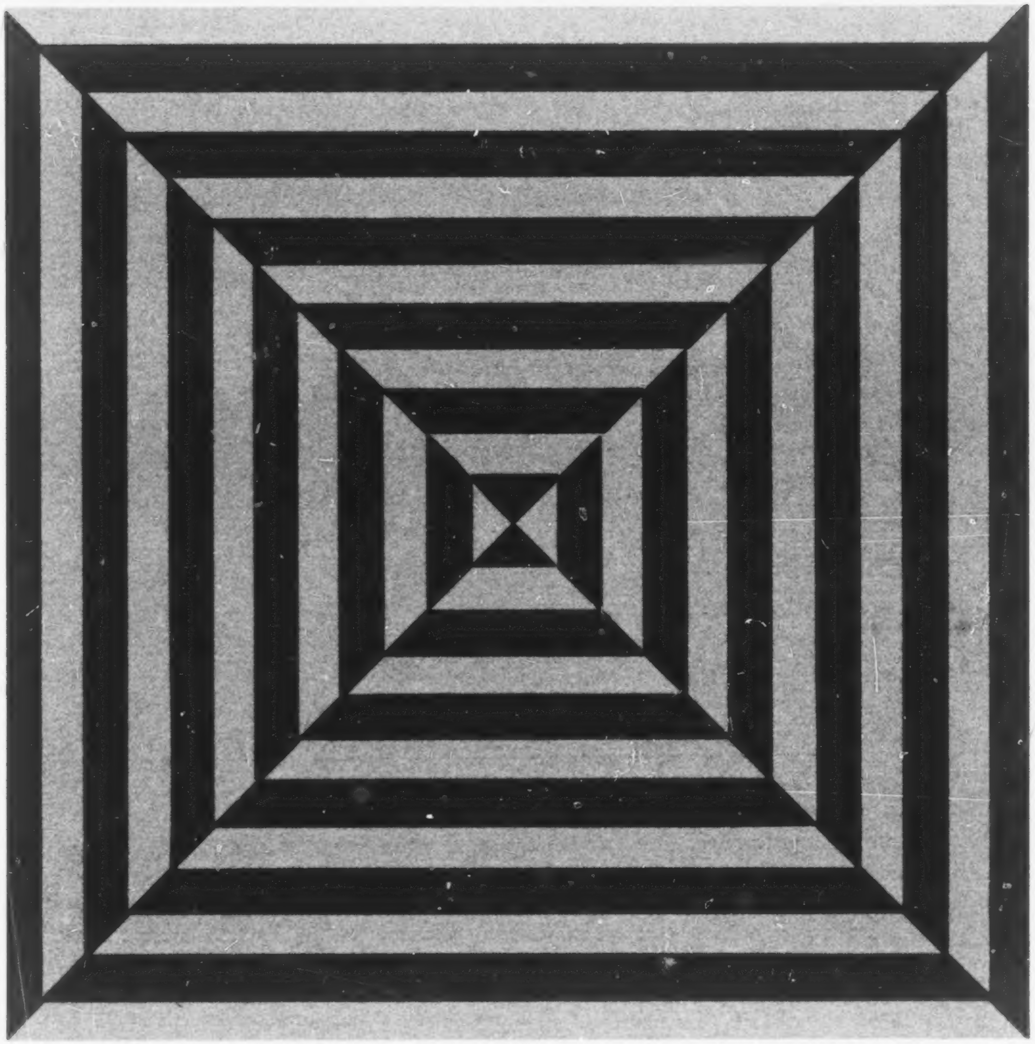
CAMPUS TRENDS, 1986

Elaine El-Khawas



HIGHER EDUCATION PANEL REPORT NUMBER 73 AUGUST 1986

American Council on Education

AMERICAN COUNCIL ON EDUCATION

Robert H. Atwell, President

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Campus Trends, 1986

Elaine El-Khawas

Higher Education Panel Reports
Number 73 August 1986

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HIGHLIGHTS

Curriculum

- American colleges remain actively engaged in curriculum review. Eighty-six percent are currently making changes in the curriculum or have recently done so.

- The "reform" reports are having an impact on higher education. Six in 10 colleges have changed (or plan to change) their academic programs. Similar percentages (58 percent and 52 percent, respectively) stated that the reform reports are spurring changes in research and assessment and in student services.

- The majority of four-year institutions offer undergraduate opportunities for study abroad, but relatively few have arrangements for overseas experience for faculty.

- Thirty-six percent of universities, 17 percent of baccalaureate colleges, and 11 percent of two-year colleges currently require some foreign language proficiency as a condition for admission.

- Increasingly large percentages of institutions now have a foreign language requirement for completion of an undergraduate degree: this is true of 66 percent of universities, 55 percent of baccalaureate colleges, and 22 percent of two-year colleges.

Student Assessment

- There is considerable support for assessment, particularly as it ties in with a college's central educational purposes. The highest level of agreement (91 percent) focused on linking assessment to improvement of instruction.

- Fewer than half of administrators supported statements that colleges should publish evidence of their institutional effectiveness, or that states should require colleges to show evidence of institutional effectiveness.

- A variety of assessment or effectiveness measures are currently in use. Twenty-three percent of colleges now have tests of college-level skills. Seventeen percent administer comprehensive exams in the major. Almost half of colleges (44 percent) test student attainment in writing.

- Stumbling blocks to campus use of assessment include: lack of funds to develop procedures (71 percent); lack of clarity over what to evaluate (64 percent); fears about misuse of results (60 percent); lack of faculty support (58 percent); and lack of good evaluation instruments (57 percent).

Institutional Status

- Although one-third of colleges had enrollment losses, a like number of other institutions increased their enrollments in 1985–86.

- Despite changing demographic conditions, at least one-third of the nation's colleges and universities reported an increase in both headcount enrollment and full-time equivalent (FTE) enrollment.

- Although most institutions reported increases in their budgets, a significant proportion of colleges and universities had no increase in their overall budgets or in their budgets for educational and general expenditures.

- Student aid budgets based on institutional funds increased for about half of institutions nationwide. Such increases occurred for three-quarters of independent institutions as well as for 4 in 10 public institutions.

- Most of the nation's colleges and universities made new faculty appointments in 1985–86 but primarily to replace faculty who were retiring or otherwise leaving. About one-third of institutions reported a net gain in full-time faculty positions.

- The use of term or contract positions (not on a tenure-track) is widely prevalent in academe today. Eight in 10 institutions reported making such appointments in 1985–86.

- The use of part-time faculty is also widespread today. In 1985–86, about 4 in 10 institutions reported net gains in their number of part-time faculty.

- Only 18 percent of administrators at baccalaureate colleges considered their levels of faculty compensation excellent or very good. Only 29 percent felt that their institution's overall financial condition was excellent or very good. These ratings were lower than those reported by two-year colleges or by universities.

BACKGROUND

This report offers findings from the third in a series of surveys of *Campus Trends.** These surveys are designed to provide timely information on changes taking place in the policies and practices of American colleges and universities.

For this third report, campus actions on assessment are given major attention along with campus responses to national reports calling for education reform. The report also examines faculty hiring practices, perceptions about institutional status, changes in enrollment and finances, and international components of academic programs.

The survey was conducted through the Higher Education Panel, an ongoing survey research program of the American Council on Education. Administrators at a nationally representative sample of 456 colleges and universities were mailed a four-page questionnaire that solicited information on current policies and practices at their institutions.

Questionnaires (see Appendix A) were mailed on March 17, 1986. By the end of May, 365 responses were received, or 80 percent of those surveyed. Respondents included: provosts, deans or academic vice presidents, 48 percent; associate deans or provosts, 10 percent; presidents, 13 percent; and other, 29 percent.

Data from responding institutions were statistically weighted, based on the Panel's stratification design and a weighting technique described in Appendix B. This adjustment means that the report's findings can be interpreted as generally representative of American colleges and universities that offer undergraduate instruction.

This survey is the third in a series of studies of *Campus Trends*. Because many questions were asked in each of the studies, comparisons to 1984 or 1985 data appear at several places in this report. For all of these studies, the reader should be mindful that many of the questions are subjective or couched in broad terms and that responses are "self-reported." The results offer an accurate picture of college administrators' views about their institutions but are subject to some variability of interpretation. Responses about the use of writing assessment, for example, may refer to a range of practices, from extensive assessment procedures to writing requirements in Freshman Composition courses.

**Campus Trends, 1984*, and *Campus Trends, 1985*. Copies of these reports are available from ACE, Division of Policy Analysis and Research, One Dupont Circle N.W., Washington, D.C. 20036. (Each copy is $5 for ACE members and $8 for nonmembers; orders must be prepaid).

FINDINGS

Curriculum

Curriculum Review Continues

American colleges remain actively engaged in curriculum review. Eighty-six percent are currently making changes in the curriculum or have recently done so (see Table 1). This level of activity has continued since 1984, when the *Campus Trends* reports first monitored curriculum review at colleges and universities.

In 1986, more than half of American colleges are currently engaged in curriculum reform. Most of these institutions are discussing changes in:

- Writing (mentioned by 85 percent);
- Other competencies (80 percent); and
- General education requirements (76 percent).

This continues the focus on the broad educational purposes of undergraduate education that was reported in earlier *Campus Trends* surveys.

Three other topics are also getting attention in campus discussions of the curriculum: international matters, policies that allow flexibility for adult learners, and issues related to the role of values and ethics in the curriculum. These topics were reported by 40 percent, 44 percent, and 45 percent of institutions, respectively. More than 6 in 10 baccalaureate colleges are considering curriculum changes related to values and to international issues.

The issue of increased course requirements is receiving less attention than it did last year. Only 40 percent of institutions (primarily baccalaureate colleges) are currently discussing such changes. In 1985, more than half (55 percent) of institutions were discussing this type of change.

National Reports Are Having an Impact

Survey results offer concrete evidence that the so-called "reform" reports issued in 1984 and 1985* are having an impact on academic programs in the nation's colleges and universities (Table 2).

The reports have been discussed widely. A majority of colleges (61 percent) have discussed the reports in faculty meetings, including 67 percent of universities, 72 percent of baccalaureate colleges, and 52 percent of two-year colleges. However, only 30 percent have established formal committees or task forces to consider the reports' recommendations.

Furthermore, various changes are being introduced in academic programs and practices (Figure 1). About 6 in 10 colleges have changed or plan to change their academic programs. Similar percentages (58 percent and 52 percent, respectively) stated that the reform reports are spurring changes in research and assessment procedures regarding students and in student services.

One-third of the nation's colleges and universities have already made changes in their academic programs due to these reports. Thirty-one percent have already changed their research and assessment proce-

---

*Major examples include: *Involvement in Learning: Realizing the Potential of American Higher Education*, Washington, D.C.: U.S. Department of Education, 1984; *Integrity in the College Curriculum: A Report to the Academic Community*, Washington, D.C.: Association of American Colleges, 1985; and *To Reclaim a Legacy: A Report on the Humanities in Higher Education*, Washington, D.C.: National Endowment for the Humanities, 1984.

dures. One in four has already made some changes in student services as a result of the various reports.

These results suggest that the "reform" reports have encouraged many of America's colleges and universities to consider ways to improve their undergraduate programs. To be sure, other forces have played a role as well, including state-level pressures, changing demographic and enrollment patterns, and the need to respond to changing competencies of entering students. Nevertheless, the overall record suggests that the reform reports can be credited with spurring a considerable degree of change on the nation's campuses.

Academic programs are the primary focus of campus changes being discussed, but the changes also encompass changes in student support services and in research that will help assess student learning. This reflects the similarly broad scope taken by the reports issued in recent years; the emphasis has centered on the entire undergraduate experience, reflecting the critical supportive role of advising, counseling, internships and other noncurricular services in undergraduate life.

Two-year colleges are more likely than their counterparts to have already made changes, especially in student services and in the research and assessment of students. Among baccalaureate colleges, on the other hand, fewer institutions reported having made changes but a higher proportion reported that changes are planned.

International Offerings: Limited but Increasing

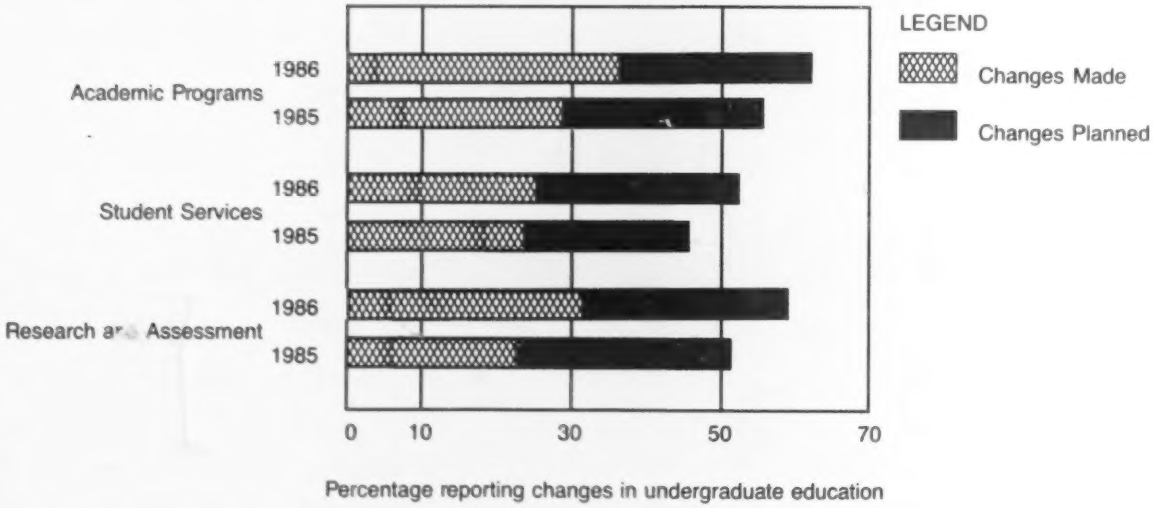
This year's survey included questions on present-day college offerings that have an international component. In light of the fact that 4 in 10 colleges are considering new ways to increase the international aspects of their curricula (see Table 1), these results on current offerings should provide a baseline for monitoring changes over the next few years.

Several questions asked about formal arrangements to offer overseas experience for students and faculty (see Table 3). In 1985–86, this primarily takes the form of study abroad. The majority of four-year institutions offer undergraduate opportunities for study abroad. Eight in 10 universities offer undergraduate study abroad and almost 4 in 10 have opportunities for graduate study abroad. Among baccalaureate colleges, 6 in 10 offer undergraduate study abroad. Relatively few two-year colleges (17 percent) have such offerings.

Another question sought information on the extent to which undergraduates participate in overseas experiences. Eighteen percent of baccalaureate colleges and 12 percent of universities estimated that more than 10 percent of their undergraduates study abroad. Most colleges reported that foreign students comprised less than 10 percent of undergraduate enrollment. At the same time, one-fourth of the universities reported that more than 10 percent of their graduate enrollment were foreign students.

FIGURE 1

Response to National Reports



Arrangements for overseas experience vary by location. At present, most study abroad experiences focus on Western Europe (Table 4). More than 7 in 10 universities and 5 in 10 baccalaureate colleges offer programs for studying in Western Europe. Opportunities for study in Latin America exist at about 1 in 4 four-year institutions. Notably, one-third of universities reported that they offer study abroad in Asian countries.

In general, about 3 in 10 American colleges and universities have formal programs linking their institutions with counterparts overseas. Most of these linkages were reported by universities, including 41 percent with linkages in Western Europe, 35 percent with linkages to Asian universities, and 23 percent with linkages in Latin America. A similar pattern emerges with overseas experience for faculty: a limited number of institutions, mostly universities, have formal arrangements to provide their faculty with overseas experience. These opportunities are primarily focused on Western Europe, although Asian destinations also receive some attention.

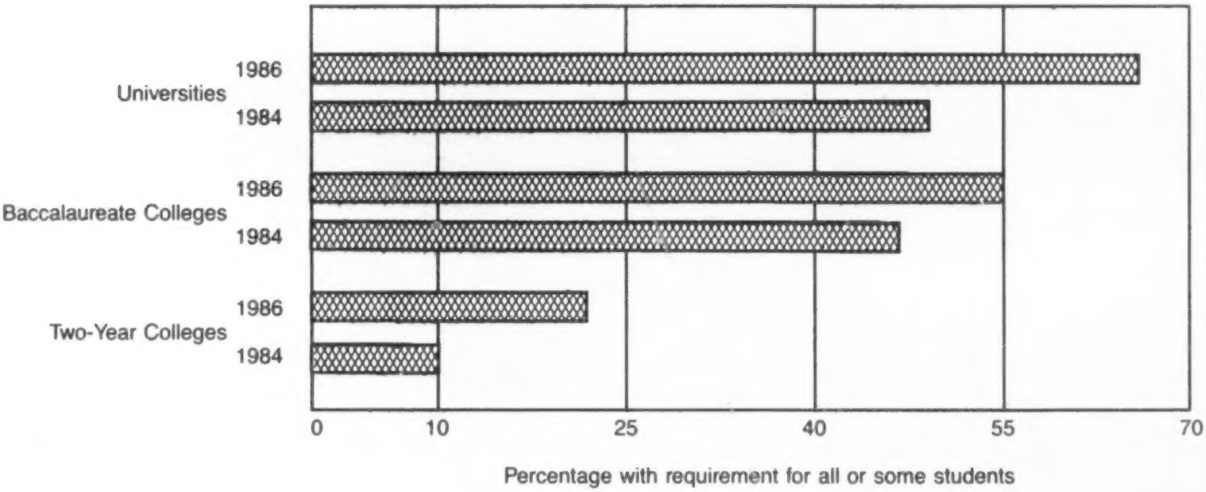
Information was also sought on institutional requirements for foreign language competency (Table 3). Regarding undergraduate admission, 36 percent of universities, 17 percent of baccalaureate colleges, and 11 percent of two-year colleges currently call for some foreign language proficiency as a requirement for admission. Increasingly large percentages now have a foreign language requirement for completion of an undergraduate degree (see Figure 2): this is true of 66 percent of universities, 55 percent of baccalaureate colleges, and 22 percent of two-year colleges. Close to half of universities have a foreign language requirement for completion of graduate degrees.

As Figure 2 also shows, colleges have increased their language requirements in recent years. In 1984 (*Campus Trends, 1984*), 3 in 10 institutions had a language requirement for completion of an undergraduate degree. In 1986, 42 percent had such a requirement.

Just over one-half of universities offer instruction in Russian, one-third offer Chinese or Japanese, and 1 in 5 offers Arabic instruction. Among baccalaureate colleges, in contrast, few offer any of these languages. This pattern also holds with area studies programs that focus on these regions. Almost 4 in 10 universities offer Russian studies, while Japanese or Chinese studies are offered by 3 in 10 universities.

FIGURE 2

Foreign Language Requirements
for Completion of an Undergraduate Degree



Student Assessment

Colleges Support the Use of Assessment

Student assessment is much talked about today, often in reference to programs that test student skills and, at other times, in the context of discussions about a college's overall effectiveness. For this survey, questions were asked about college uses of assessment, defined broadly as any measure—other than end-of-course grading—by which the college evaluates its students or programs. Administrators were also asked for their opinions about potential directions that assessment may take.

Over the last few years, discussions about assessment have often emphasized the views of state officials or, instead, have focused on a few colleges and universities with "model" approaches to assessment. This survey offers a different perspective, showing the opinions held by a cross-section of administrators on questions related to assessment and institutional effectiveness. In general, there is considerable support for assessment, particularly as it ties in with a college's central educational purposes (see Figure 3).

The highest level of agreement (91 percent) focused on linking assessment to improvement of instruction (Table 5). Strong support was also recorded on several related statements:

• Link assessment to institutional effectiveness	88 percent
• Include feedback to students	85 percent
• Link assessment to planning and budgeting	79 percent

Other results are also of interest. About 7 in 10 administrators indicated that:

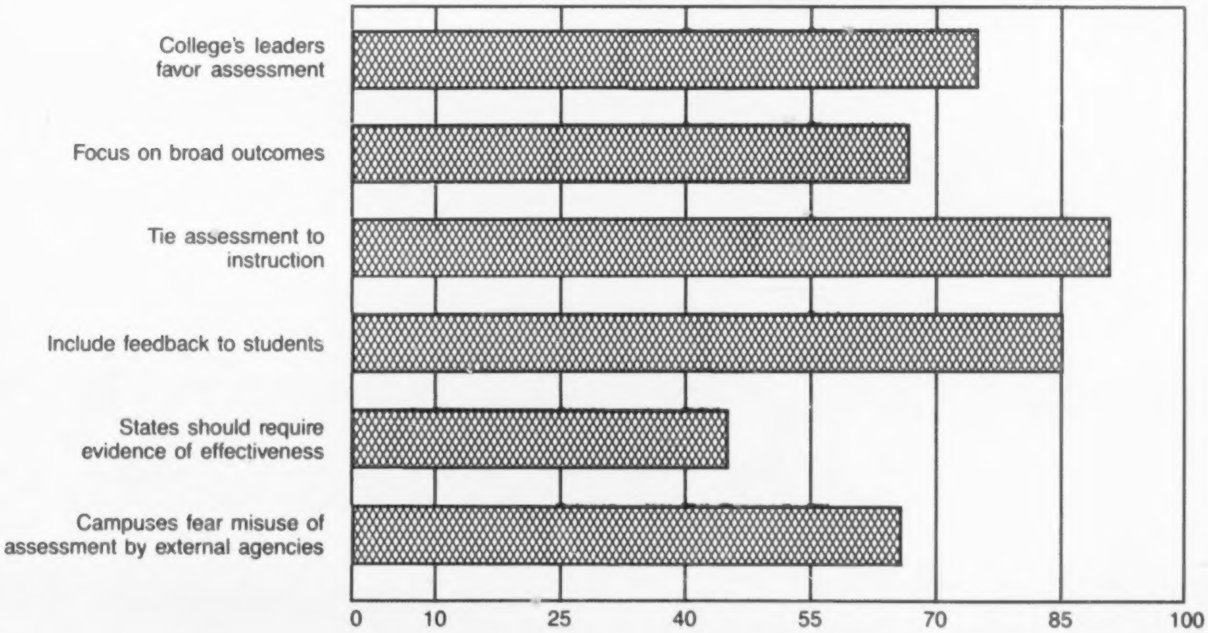
- The college's leadership favors the use of assessment.
- Assessment should focus on broad outcomes.
- College officials have fears about misuse of assessment results by external agencies.

Several areas of lower agreement involve academe's external constituencies. Forty-two percent of administrators supported statements that colleges should publish evidence of their institutional effectiveness, and forty-five percent agreed that states should require colleges to show evidence of institutional effectiveness. Independent institutions were especially wary of these statements.

There were some differences by type of college on these statements. Administrators at two-year colleges gave stronger support than others to assessment, espe-

FIGURE 3

Administrators' Views on Assessment
(Percentage agreeing with each statement)



cially to its use in conjunction with institutional effectiveness. They were more likely to say that their institution's faculty would support the use of assessment, and they were more likely than others to support publication of evidence on a college's effectiveness.

At baccalaureate colleges, the strongest support appeared for linking assessment to instructional improvement and to institutional effectiveness. University administrators supported the instructional emphasis of assessment voiced by others; they were especially likely to support assessment measures that focus on broadly defined outcomes.

Table 6A summarizes the views of campus administrators about measures that are appropriate for use in student assessment. Relatively high agreement is apparent for a good number of measures, especially those that focus on the broad competencies (e.g., writing, critical thinking) that should be part of a good education. Notably, two-year colleges join with four-year institutions in showing strong support for assessment in such areas as writing and oral communication skills. In general, baccalaureate colleges show the strongest support for assessment measures, including support (by 82 percent) of comprehensive exams in the major.

Many administrators also support the use of several measures of institutional effectiveness (Table 7A). The highest level of agreement, noted by 85 percent or more, is directed to the following:

- Job placement rates of graduates;
- Retention and graduation rates;
- Ratings of the institution by graduates; and
- Long-term outcomes of graduates.

There are important differences by type of institution. Among universities, 94 percent considered faculty accomplishments to be appropriate, and 87 percent supported the use of information on research accomplishments. Among baccalaureate colleges, the areas receiving the strongest support included: long-term outcomes of graduates (95 percent); job placement rates of graduates (92 percent), and retention and graduation rates (87 percent). The highest areas of agreement among two-year colleges included job placement rates (92 percent), the performance of graduates on the job (89 percent), and ratings of the institution by graduates (92 percent).

Various Measures Are in Use

As Tables 6 and 7 show, a variety of assessment measures are currently in use by campuses, although probably for internal planning purposes. The most prevalent practices are those that focus on entering students: almost 9 in 10 institutions reported use of placement tests for mathematics and English skills (Table 6B). Two-thirds also have pre- and post-tests for students taking remedial courses. This may reflect practices that were already in place on the nation's campuses before the recent discussion was underway. A number of other areas appear to be the subject of growing interest, following recent attention to assessment. Thus, twenty-three percent of colleges now have tests of college-level skills.

Relatively few institutions (17 percent) administer comprehensive exams in the major (including 1 in 4 universities and baccalaureate colleges). Nine percent of institutions report that they use some form of "value-added" measures for assessing students. Similarly, 18 percent of institutions (and 1 in 4 baccalaureate colleges) now offer some type of assessment on critical thinking skills. Twenty-six percent of colleges assess student skills in oral communications. Notably, almost half of colleges (44 percent) test student attainment in writing.

Table 7B shows related information on measures of institutional effectiveness that are in use (see Figure 4). Three-quarters or more of institutions use the following measures:

- Retention and graduation rates;
- Number of degrees/certificates awarded;
- Number of courses completed or credits earned;
- Number of students served; and
- Job placement rates of graduates.

Six others were mentioned by 50 percent or more of colleges:

- Pass rates on professional licensing exams;
- Percent going on for further education;
- Honors and other achievements of graduates;
- Achievements of faculty;
- Accomplishments in community service; and
- Ratings of the institution given by graduates.

Notably, many of these measures look to various "outcomes" of undergraduate education. Usage varies somewhat by type of institution: two-year colleges show very high percentages on degrees/certificates awarded and job placement rates. Among universities, the most frequently mentioned measure involved faculty achievements, followed by retention or graduation rates of students. Most baccalaureate colleges (77 percent) currently use retention rates.

On all of these measures, a sizeable gap is evident between current practice and the level and types of assessment that college officials appear to support. In part, this reflects a "lag" that is inevitable in implementing any reforms. The strong showing on writing assessment, for example, probably reflects decades-old activity to spur more attention to writing. Undoubtedly, too, another key problem is the lack of readily available and suitable assessment measures. Indeed, measures currently in use are "counting devices" for the most part (degrees awarded, pass rates, etc.), not the complex and multidimensional measures that would be most appropriate to undergraduate learning.

Obstacles Arise in Implementation

Table 8 points out several stumbling blocks to campus use of assessment. The areas that most administrators considered as obstacles (major or minor) included:

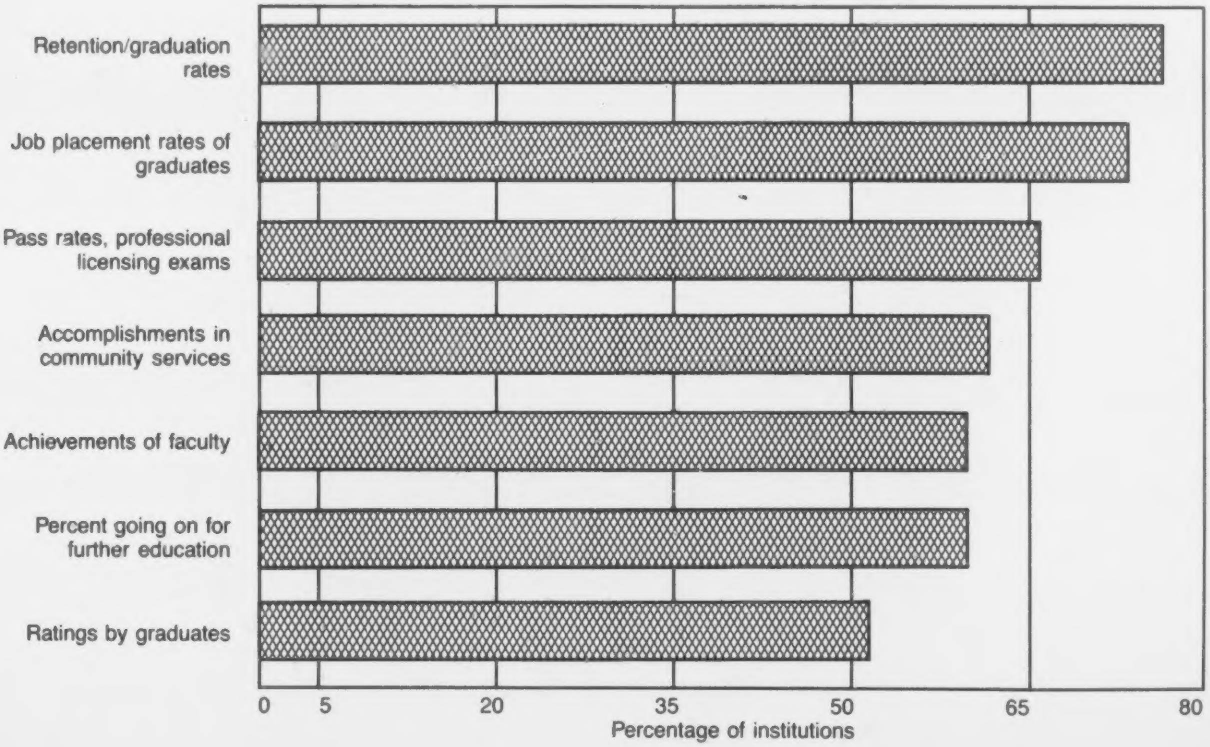
• No funds to develop procedures	71 percent
• Not clear what to evaluate	64 percent
• Fears about misuse of results	60 percent
• Lack of faculty support	58 percent
• No good evaluation instruments	57 percent

Relatively few administrators voiced concern about the suitability of their curricula to assessment or the availability of assessment expertise.

The two issues that emerged as major obstacles to assessment are lack of clarity on what to evaluate and no funds for developing assessment procedures. The problem of no clarity on what to evaluate may reflect the nebulous quality of debate that has taken place so far on assessment. It probably also reflects the significant problems each institution must face in determining the specific emphasis of any assessment plan and, then, of finding suitable methods for evaluating the important outcomes for that institution. The response about lack of funds probably reflects the constrained financial mood of higher education today, but it may also reflect the general concern that implementing assessment is not a simple matter.

Considerable concern also exists about potential misuse of results. Most campus officials agreed that there is fear about misuses of assessment by external agencies. A majority also termed this concern an obstacle to development of assessment on their campuses.

FIGURE 4
Selected Measures of Effectiveness
Now in Use



Institutional Status

Enrollment Mix Continues to Change

Higher education in 1985–86 was experiencing the sixth year of a demographic downturn in the population of 18-year olds. After several years of stable enrollment overall, national figures for fall 1985 enrollment were expected to show a slight decrease.

How has this affected individual colleges? Survey results (Table 9) demonstrate that a variety of outcomes have occurred: although one-third of colleges had enrollment losses, a like number of other institutions increased their enrollment in 1985–86. In view of the consistently downward direction of demographic trends, it is striking that the enrollment picture is so mixed.

Despite changing demographic conditions, at least one-third of the nation's colleges and universities reported an increase in both their headcount enrollment and full-time equivalent (FTE) enrollment (see Figure 5). Notable gains helping to account for this overall pattern included:

- Increased master's level enrollment, reported by 4 in 10 baccalaureate colleges and universities.
- Increased doctoral enrollment, reported by 29 percent of universities.
- Increased enrollment of Asian students, especially as reported by 39 percent of universities.
- Continued increases in part-time enrollment, especially at 41 percent of two-year colleges and 39 percent of baccalaureate colleges.
- Continuing increases in the median age of students, especially as reported by 22 percent of two-year colleges and by 13 percent of baccalaureate colleges.

Demographic and financial realities are, nevertheless, having their effect on a sizeable number of institutions. One-third reported that FTE enrollment was down at least 2 percent compared to a year earlier. Enrollment of first-time freshmen was also down at one-third of institutions. These decreases were reported by two-year colleges more than by other institutions. Changes in full-time enrollment also showed a downward tilt: 40 percent of two-year colleges and 44 percent of baccalaureate colleges reported decreases in full-time enrollment over the year earlier, and both of these figures outweigh those for institutions with increased full-time enrollment.

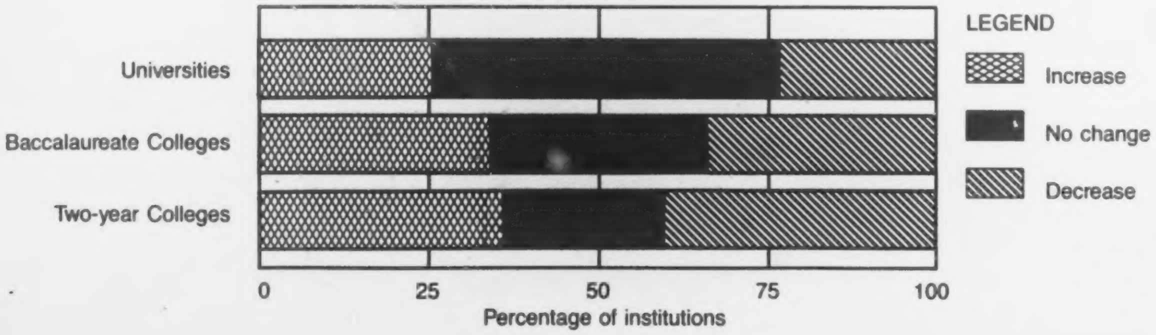
Universities had the most stable enrollments: they were least likely to report enrollment decreases, while they also showed the lowest percentage with an enrollment increase. This may be due in part to increased graduate enrollment, noted above. It may also reflect a greater ability of universities, compared to smaller institutions, to shift the mix of their enrollment, (e.g., to increase enrollment in some fields to offset enrollment decreases in other fields; or to enroll more out-of-state students as in-state enrollments decrease).

The survey's results on black and other minority enrollment must be interpreted with caution in light of national reports that point to decreased minority enrollment. The institutional picture, as reflected in Table 9, shows that a small number of institutions made gains in minority enrollment while others had stable or dropping minority enrollment in 1985–86.

To some extent, shifts in minority enrollment follow expected regional patterns. Unpublished tabulations show that increases in Asian, Hispanic and Native American enrollment are greatest in the West, for example. However, it is also true that the increases in Asian students reported by universities appear across the country. Just over half of the universities in the West and the East reported gains, while about 3 in 10 universities in the South and the Midwest reported increases in Asian students.

FIGURE 5

Changes in Full-time Equivalent Enrollment



Financial Pressures Are Evident

Table 10 offers a capsule picture of some of the financial pressures facing colleges and universities today. Although most institutions reported increases in their budgets, a significant proportion of colleges and universities had no increase in their overall budget or in their budget for educational and general expenditures. In fact, 9 percent (including 12 percent of public institutions and 6 percent of independent institutions) suffered a decrease in their 1985–86 budget for educational and general purposes, compared to a year earlier. Decreases in overall budget were almost entirely found in the South and in the West. The decreases in the West were primarily accounted for by two-year institutions.

The survey results reflect tight financial pressures on both independent and public institutions. The primary source of income for public institutions—state and local revenues—grew for only two-thirds of public institutions. At the same time, only about half of the independent institutions reported increases in budgeted income from gifts or endowment.

One in three institutions reported a decrease in federal student aid to their institutions, a decrease roughly in line with the proportion of institutions reporting an enrollment decline. Student aid budgets based on institutional funds increased for about half of institutions nationwide. Such increases occurred for three-quarters of independent institutions as well as for 4 in 10 public institutions. This suggests that many colleges are facing increasing pressures on institutional resources for aid to students.

Limited Faculty Hiring Takes Place

Most of the nation's colleges and universities made new faculty appointments in 1985–86 (see Table 11) but did so primarily to replace faculty who were retiring or otherwise leaving. About one-third of institutions reported a net gain in full-time faculty positions.

Universities were the most likely to make net gains: 46 percent increased their full-time positions and 41 percent increased their part-time positions. Two-year colleges were the most likely to experience net losses, both in full-time and part-time positions.

Testimony to the difficult financial circumstances in higher education today are the figures in Table 11 that show institutions with a net loss in full-time faculty over the previous year. Public institutions were more likely than independent institutions to report such a loss. Notably, about 1 in 5 colleges also reported a net decrease in the number of their faculty in each of the last two years (cf. *Campus Trends, 1984* and *Campus Trends, 1985*).

The use of term or contract positions (not on a tenure-track) is widely prevalent in academe today. Eight in 10 institutions reported making such appointments in 1985–86. This pattern held across types of institutions. It represents an increase over a year earlier, when 7 in 10 institutions had hired full-time faculty in term or contract positions (*Campus Trends, 1985*).

Hiring in tenure-track positions continues, too. Overall, 77 percent of institutions made such appointments, up from 67 percent in 1985. Almost all universities (95 percent) made such appointments.

The use of part-time faculty is also widespread today. In 1985–86, about 4 in 10 institutions reported net gains in their number of part-time faculty. Some of this may reflect hiring on a temporary basis in fields where it is difficult to recruit qualified full-time faculty.

Administrators Face A Variety of Concerns

Survey respondents rated their institutions on a variety of factors, including the level of faculty compensation, the job prospects of graduates, the college's overall financial condition and the status of the institution's relationships with accrediting agencies and with federal and state agencies. The results (Table 12) offer a rich and varied snapshot of the status of higher education today.

It is significant in itself that relatively few items received "excellent" or "very good" ratings. The only areas with high scores did not focus on the college but, instead, on its relationships with outside groups. Eight in 10 colleges and universities gave favorable ratings to their relationships with regional accrediting agencies. This pattern held across types of institutions. Seven in 10 gave good ratings on their relationships with specialized accrediting agencies.

Relationships with federal and state agencies were also rated. About 6 in 10 institutions gave good marks to their relationships with state agencies, although slightly fewer gave good marks on financial matters. Similarly, 6 in 10 characterized their relationships with federal agencies as excellent or very good. Baccalaureate colleges were least satisfied: only half gave good marks to their relationships with federal agencies. This may reflect concern over the availability of federal student assistance as well as recent dissatisfaction with the National Science Foundation's support of undergraduate science education at smaller institutions.

The areas that received very few good ratings were:

- General level of preparation of entering students;
- Adequacy of faculty compensation; and
- Adequacy of student aid.

Adequacy of student aid emerged as a concern across all types of institutions. Fewer than 3 in 10 administrators felt that their institution's student aid offerings were adequate. General concern exists, too, about the overall financial condition of their institutions: only about one-third of administrators rated their institutions well on this item (see Figure 6).

There were salient differences across institutional types. Among universities, opportunities for faculty development and levels of faculty compensation were among the items with the lowest ratings. Among two-year colleges, the preparation levels of entering students received the lowest ratings, with very few administrators giving this an excellent or very good rating.

It can be seen too that, on almost every item, fewer administrators at baccalaureate colleges gave good ratings than did other administrators. Several problem areas are evident, including: the preparation level of entering students, the college's overall financial condition and ability to respond to enrollment shifts, faculty compensation and faculty development opportunities, and the adequacy of student aid.

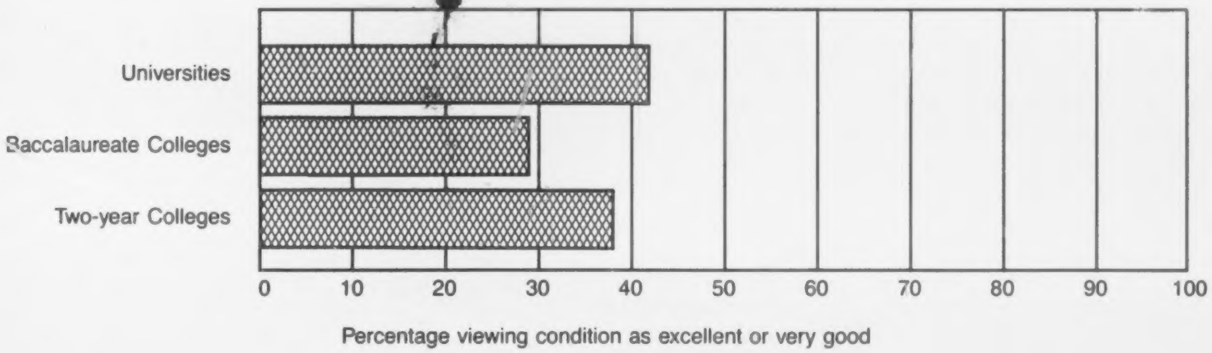
SUMMARY

This survey's findings on the general status of colleges and universities highlight a variety of problems: enrollments overall are steady or down for the majority of institutions; financial pressures are evident and are creating other problems, including inadequate student aid and uncomfortable levels of faculty compensation.

Yet, the survey also documents a substantial degree of activity directed to undergraduate education. Most colleges and universities have been reevaluating their curricular offerings during the past few years, and many have made changes in programs. The call for better assessment of student learning is largely compatible with this attention to undergraduate education. It is clear, however, that college administrators do not currently have a definite sense of what is the best focus for assessment and many feel that existing evaluation instruments are not suitable to the broad educational purposes they consider to be appropriate outcomes of undergraduate study.

Continuing discussion of assessment can be expected. For campus-level discussions, however, it is likely that debate over potential approaches will be tempered by fiscal and enrollment problems that campuses are experiencing at this point in the decade.

FIGURE 6
Administrator Views on Institution's Overall Financial Condition



DETAILED STATISTICAL TABLES

TABLE 1—Curricular Review, 1985–86
(Percentage reporting each emphasis)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Currently Reviewing:	57	56	46	54	56	52
Recently Completed:	31	29	36	32	31	33
Current or recent review:						
Emphasis on writing	71	92	83	79	77	82
Emphasis, other competencies	73	87	75	78	76	79
Increased course requirements	33	52	39	39	39	40
New gen. educ. requirements	67	85	85	76	75	77
More flexibility, adults	48	38	21	40	43	35
More attention, international	20	60	47	37	28	48
Attention, values or ethics	26	61	51	41	31	54
Recently completed:						
Emphasis on writing	54	83	84	69	74	63
Emphasis, other competencies	61	90	80	74	76	71
Increased course requirements	19	57	55	38	39	36
New gen. educ. requirements	64	87	86	75	77	73
More flexibility, adults	39	30	19	32	37	26
More attention, international	13	54	45	32	30	33
Attention, values or ethics	15	64	42	35	30	40
Current review:						
Emphasis on writing	80	96	83	85	79	93
Emphasis, other competencies	80	86	71	80	77	84
Increased course requirements	40	50	27	40	38	43
New gen. educ. requirements	69	84	84	76	73	80
More flexibility, adults	53	43	23	44	47	41
More attention, international	24	64	49	40	26	58
Attention, values or ethics	33	60	58	45	32	63

Source: *Campus Trends, 1986*, American Council on Education
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 2—Response to National Reports
(Percentage with each response)*

	2-Year Colleges		Baccalaureate Colleges		Universities		Total		Public		Independent	
	Yes	Planned	Yes	Planned	Yes	Planned	Yes	Planned	Yes	Planned	Yes	Planned
Discussion of the reports:												
In faculty meetings	52	11	72	10	67	3	61	9	60	8	63	9
With the board of trustees	40	9	39	12	38	9	39	10	39	7	40	13
With outside consultants	19	3	24	11	26	3	22	5	20	4	24	7
Task force/committee review	28	6	31	9	33	6	30	7	34	5	25	9
Changes, academic programs	41	22	29	34	33	21	36	25	40	20	30	32
Changes, student services	29	26	20	35	21	18	25	27	27	21	22	34
Changes, research/assessment	38	22	23	36	23	27	31	27	37	22	23	32

*Figures do not total 100 percent because "No" responses are not shown.

Source: *Campus Trends, 1986*, American Council on Education.
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 3—International Education Activities
(Percentage reporting each type)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Programs offered in one or more locations for:						
Undergraduate study abroad	17	64	81	44	31	60
Graduate study abroad	0	5	36	18*	32*	10*
Noncredit study abroad	9	10	26	13	11	15
Institutional linkages	13	35	61	30	28	33
Students internships	6	11	22	11	10	11
Overseas experience for:						
Language faculty	9	21	38	19	18	19
Other faculty	11	24	41	21	21	22
Technical assistance	4	2	21	7	11	3
More than 10 percent of undergraduates study abroad:	0	18	12	15*	1*	24*
Foreign students are more than 10 percent of:						
Undergraduate enrollment	8	12	12	10	7	13
Graduate enrollment	0	1	24	11*	19*	6*
Foreign language requirements for:						
Undergraduate admissions	11	17	36	18	14	23
Undergraduate degree	22	55	66	42	39	46
Graduate degree	0	19	47	24*	39*	16*
Language instruction is offered in:						
Arabic	3	4	20	7	6	8
Chinese	6	11	39	15	16	14
Japanese	7	10	35	14	15	12
Russian	6	15	53	19	18	20
Other nonWestern areas	7	9	24	11	13	10
Other studies are offered in:						
Arabic	1	6	14	5	4	7
Chinese	5	13	31	13	12	13
Japanese	5	11	29	12	11	13
Russian	3	16	40	14	14	15
Other nonWestern areas	6	16	34	15	15	15

*Based on four-year institutions only.

Source: *Campus Trends, 1986*, American Council on Education
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 4—Overseas Experiences Offered by Region
(Percentages of Institutions with Offerings)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Undergraduate study abroad in:						
Latin America	6	24	29	16	14	19
Western Europe	16	49	73	38	28	49
Eastern Europe	3	10	14	7	5	9
Africa/Middle East	5	11	19	9	8	11
Asia	5	16	32	14	12	16
Institutional linkages in:						
Latin America	1	7	23	8	9	6
Western Europe	9	19	41	19	17	21
Eastern Europe	1	4	12	4	5	4
Africa/Middle East	1	3	11	4	5	3
Asia	6	19	35	16	16	16
Overseas experience for faculty in:						
Latin America	4	5	14	6	7	5
Western Europe	7	14	30	14	13	15
Eastern Europe	1	6	10	4	4	4
Africa/Middle East	3	4	13	5	7	4
Asia	5	14	22	11	13	9

Source: *Campus Trends, 1986*, American Council on Education.
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges, and 165 universities).

TABLE 5—Administrators' Views on Assessment
*(Percentages)**

	2-Year Colleges		Baccalaureate Colleges		Universities		Total		Public		Independent	
	Agree	Disagree	Agree	Disagree	Agree	Disagree	Agree	Disagree	Agree	Disagree	Agree	Disagree
College's leaders favor assessment	83	5	80	0	48	13	75	5	77	6	72	3
Most faculty support assessment	71	4	56	17	31	23	58	12	60	10	57	14
Will require much experimentation	48	33	60	21	61	20	54	27	52	33	58	19
Little discussion of assessment	44	56	49	50	63	32	49	49	46	52	54	45
Standardized tests a risk	28	41	46	35	50	23	38	35	36	37	40	34
Focus on broad outcomes	62	16	72	14	73	10	67	14	67	15	68	13
Tie to instructional improvement	91	0	95	2	87	2	91	1	95	1	87	2
Include feedback to students	89	3	82	5	82	4	85	4	92	4	77	3
Link to institutional effectiveness	92	1	89	1	77	6	88	2	86	3	89	2
Link to planning/ budgeting	85	2	75	5	68	11	79	5	79	6	78	4
Publish evidence of effectiveness	52	13	33	24	30	30	42	20	50	19	33	21
For accred. show effectiveness	70	9	55	19	60	21	64	14	74	12	52	17
States to require effectiveness	56	17	28	35	40	36	45	26	59	20	28	34
Campus officials fear misuse by external agencies	62	20	70	17	69	8	66	16	62	17	69	16

*Figures do not total 100 percent because "Uncertain" responses are not shown.

Source: *Campus Trends, 1986*, American Council on Education.

Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 6A—Appropriate Methods of Assessing Student Learning
(Percentage agreeing for each type)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
College-level skills tests	61	70	55	62	62	62
Tests in general education	48	71	51	55	52	59
Comprehensive exams in major	46	82	67	61	51	73
Attainment of "higher-order" skills in:						
Critical thinking	69	89	79	77	73	82
Quantitive skills	74	88	83	80	75	84
Oral communication	83	88	82	84	81	88
Writing	85	91	87	87	84	90
"Value-added" measures	62	80	64	67	65	70
Placement tests, Mathematics	95	95	89	93	98	88
Placement tests, English	95	88	89	92	99	83
Placement tests, Reading	93	78	71	84	93	73
Placement tests, other skills	75	59	64	68	70	65
Pre- & post-tests, remedial	85	78	67	79	90	66

Source: *Campus Trends, 1986*, American Council on Education.
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 6B—Methods Currently in Use for Assessing Student Learning
(Percentage using each type)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
College-level skills tests	23	26	19	23	26	19
Tests in general education	15	13	15	14	16	12
Comprehensive exams in major	7	26	25	17	11	23
Attainment of "higher-order" skills in:						
Critical thinking	15	26	17	18	15	22
Quantitive skills	14	27	24	20	18	23
Oral communication	26	29	23	26	27	25
Writing	40	50	43	44	42	46
"Value-added" measures	9	10	9	9	11	8
Placement tests, Mathematics	98	74	82	88	95	79
Placement tests, English	97	79	79	88	94	81
Placement tests, Reading	89	52	52	70	83	55
Placement tests, other skills	38	34	36	36	37	36
Pre- & post-tests, remedial	69	63	58	65	74	54

Source: *Campus Trends, 1986*, American Council on Education.
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 7A—Appropriate Measures of College Effectiveness
(Percentage agreeing for each measure)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Retention/graduation rates	89	87	87	88	87	89
Degrees/certificates awarded	78	71	79	76	79	73
Pass rates, prof. licensing exams	82	75	84	80	87	72
Students served	76	69	67	72	77	65
Courses completed/credits earned	81	77	70	77	78	76
Test scores of graduates (professional)	58	65	80	66	67	65
Test scores, other graduates	56	52	67	58	55	61
Other measures of student learning	75	89	77	80	75	85
Percent going for further education	79	71	79	77	76	78
Achievements, recent graduates	75	86	83	80	75	86
Job placement rates of graduates	92	92	82	90	90	90
Graduates' performance on the job	89	78	74	83	86	78
Ratings by graduates	92	82	84	88	91	84
Long-term outcomes of graduates	82	95	83	86	81	91
Achievements of faculty	73	83	94	81	80	81
Institutional accomplishments in:						
Grants/contracts	63	53	83	64	67	61
Community services	81	68	85	78	87	67
Research	34	44	87	49	48	49

Source: *Campus Trends, 1986*, American Council on Education.

Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 7B—Measures of College Effectiveness Now In Use
(Percentage reporting each measure)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Retention/graduation rates	78	77	78	77	78	77
Degrees/certificates awarded	75	65	78	73	80	65
Pass rates, prof. licensing exams	69	63	66	66	73	58
Students served	83	66	70	76	83	67
Courses completed/credits earned	77	75	72	75	76	75
Test scores of grads (professional)	22	25	49	30	34	26
Test scores, other graduates	15	18	31	20	22	17
Other measures of student learning	42	38	38	40	41	39
Percent, going for further education	62	60	53	60	58	62
Achievements, recent graduates	54	64	70	60	53	69
Job placement rates of graduates	80	71	66	74	77	72
Graduates' performance on the job	52	31	23	40	45	34
Ratings by graduates	54	46	54	52	59	43
Long-term outcomes of graduates	26	35	29	29	26	33
Achievements of faculty	48	66	82	60	58	63
Institutional accomplishments in:						
Grants/contracts	48	35	71	49	55	42
Community services	66	50	69	62	73	48
Research	20	23	73	33	37	28

Source: *Campus Trends, 1986*, American Council on Education.

Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 8—Potential Obstacles to Student Assessment
*(Percentage of Institutions)**

	2-Year Colleges		Baccalaureate Colleges		Universities		Total		Public		Independent	
	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor
No good evaluation instruments	14	38	23	38	25	37	19	38	18	33	21	43
Not suited to our curriculum	7	15	5	33	11	27	7	23	5	23	9	23
Faculty do not support it	3	45	26	40	27	43	15	43	11	41	19	45
Not clear, what to evaluate	21	35	36	35	45	31	30	34	27	37	34	30
No funds to develop it	33		47	33	43	36	39	32	41	29	36	
Students would be		30										36
unhappy	12	30	4	49	11	55	10	41	9	44	11	36
Fears about misuse	5	52	21	37	20	49	13	47	13	41	12	53
Key administrators lack interest	6	19	9	23	17	32	9	23	8	24	10	21
No expertise	13	27	14	41	5	34	12	32	9	30	15	35

*Figures do not total 100 percent because "Not an Obstacle" responses are not shown.

Source: *Campus Trends, 1986*, American Council on Education.

Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 9—Changes in Enrollment (1985–86 vs 1984–85)
*(Percentage of institutions reporting a change)**

	2-Year Colleges		Baccalaureate Colleges		Universities		Total		Public		Independent	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
Headcount enrollment	35	37	42	34	27	19	35	32	35	31	36	34
Total FTE enrollment	36	40	34	34	25	23	33	35	35	34	31	35
Full-time students	30	40	34	44	29	20	31	37	31	37	31	36
Part-time students	41	31	39	15	32	21	39	24	41	29	37	19
First-time freshmen	32	38	31	34	32	32	32	36	34	32	29	40
Enrollment, master's level	0	0	40	20	41	19	35	20	34	22	36	18
Enrollment, doctoral level	0	0	0	0	29	7	18	10	31	3	7	16
Black students	22	11	22	8	24	20	22	12	25	15	20	8
Hispanic students	13	10	8	8	24	9	14	9	17	12	10	6
Asian students	17	5	10	5	39	8	20	6	20	5	20	6
Native American students	9	6	7	7	20	11	11	8	13	8	8	7
Median age of students	22	3	13	0	6	2	16	2	20	3	12	1

*Figures do not total 100 percent because "No Change" responses are not shown.

Source: *Campus Trends, 1986*, American Council on Education.

Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 10—Changes in Institutional Finances
*(Percentage of institutions reporting a change)**

	2-Year Colleges		Baccalaureate Colleges		Universities		Total		Public		Independent	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
Overall budget	69	9	73	8	83	10	73	9	73	11	73	7
Budget, educational & general	67	10	70	7	82	10	71	9	69	12	74	6
Budget, institutional student aid	45	6	67	10	66	7	56	7	43	10	70	4
Budgeted income, endowment	30	2	47	5	50	6	41	4	30	4	51	4
Budgeted income, gifts	42	8	62	4	68	4	54	6	50	5	59	7
Revenues, state/local govt.	58	10	35	9	63	11	52	10	68	13	32	7
Federal student aid (excl. GSL)	35	14	31	26	36	15	34	18	33	16	36	19

*Figures do not total 100 percent because "No Change" responses are not shown.

Source: *Campus Trends, 1986*, American Council on Education.

Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 11—Patterns of Faculty Hiring
(Percentage of Institutions)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Full-time faculty were hired in:						
Tenure-track positions	65	80	95	77	83	70
Term or contract positions	73	82	90	79	80	79
Number of full-time faculty, 1985–86 versus 1984–85:						
Net gain	31	40	46	37	39	34
No net change	45	45	33	42	35	52
Net loss	24	15	21	21	26	14
Number of part-time faculty, 1985–86 versus 1984–85:						
Net gain	41	32	41	38	40	36
Not net change	37	50	43	42	35	51
Net loss	22	18	16	19	25	12

Source: *Campus Trends, 1986*, American Council on Education.
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

TABLE 12—Administrator Views on Institutional Status
(Percentage rating own institution as excellent/very good)

	2-Year Colleges	Baccalaureate Colleges	Universities	Total	Public	Independent
Preparation of entering students	7	18	42	17	12	24
Job prospects for degree recipients	43	45	67	49	46	52
Ability to respond, enrollment shifts	40	32	43	38	37	40
Ability to attract good faculty	58	52	59	56	48	66
Faculty development opportunities	41	25	33	35	33	36
Faculty compensation	33	18	39	30	36	22
Overall financial condition	38	29	42	36	35	38
Adequacy of student aid	25	25	23	24	26	23
Relationships, regional accred.	82	79	83	81	82	81
Relationships, specialized accred.	73	64	75	71	74	68
Relationships, fed. agencies	62	51	58	58	57	60
Relationships, state agencies:						
On curriculum	62	56	62	60	61	59
On financial matters	56	54	52	54	55	53
In general	62	57	58	60	59	61

Source: *Campus Trends, 1986*, American Council on Education.
Weighted survey data (80 percent response) received from 365 institutions (129 two-year colleges, 71 baccalaureate colleges and 165 universities).

APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

March 17, 1986

Dear Higher Education Panel Representative:

Attached is Higher Education Panel Survey No. 73 sponsored by the American Council on Education and supported in part by a grant from the Lilly Endowment. This is the third in a series of annual surveys designed to obtain general information on campus trends. The questionnaire elicits information on recent or pending changes in a variety of institutional policies and practices affecting faculty, the curriculum, and other areas.

This questionnaire asks general questions or seeks opinions about changes in academic policies. It should be completed by the academic vice president, if at all possible.

Please understand that your institution's responses will be held in strict confidence. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identified with your institution.

Please return the completed questionnaire by April 21, 1986. A preaddressed envelope is enclosed for your convenience. If you have any questions or problems, please do not hesitate to telephone us collect at 202/939-9445.

Sincerely,
Elaine El-Khawas

Elaine El-Khawas
Vice President for
Policy Analysis and Research

Attachment

One Dupont Circle, Washington, D.C. 20036-1193 (202) 939-9445

AMERICAN
COUNCIL ON
EDUCATION

Higher Education Panel Survey Number 73

CAMPUS TRENDS, 1986

This questionnaire asks a series of general questions and seeks your opinions about policies and practices at your institution. All questions refer to 1985–1986.

Please circle an answer for each question. If not applicable, please write in N/A.

I. ENROLLMENT AND FINANCES

A. How did your institution's enrollment change for 1985–86 compared to 1984–85:

	Increase (2% or more)	No Change	Decrease (2% or more)
1. Overall (headcount) enrollment	3	2	1
2. Total FTE enrollment	3	2	1
3. Full-time students	3	2	1
4. Part-time students	3	2	1
5. First-time freshmen	3	2	1
6. Enrollment for master's degrees	3	2	1
7. Enrollment for doctoral degrees	3	2	1
8. Black students	3	2	1
9. Hispanic students	3	2	1
10. Asian students	3	2	1
11. Native American students	3	2	1
12. Median age of students	3	2	1

B. How did your institution's finances change for 1985–86 compared to 1984–85:

	Increase (2% or more)	No Change	Decrease (2% or more)
1. Institution's overall budget	3	2	1
2. Budget for educational & general expenses	3	2	1
3. Budget for institutional student aid	3	2	1
4. Budgeted income from endowment	3	2	1
5. Budgeted income from gifts & alumni giving	3	2	1
6. Revenues from state and local government	3	2	1
7. Total federal student aid (excluding GSL)	3	2	1

II. CURRICULUM

A. Is a general review of curriculum underway or has one recently been completed?

Yes, currently underway	3
Yes, completed within the last few years	2
No	1

If yes, does it include:

	Yes	No
New general education requirements	2	1
Greater emphasis on writing	2	1
Greater emphasis on other competencies (communication, reasoning, etc.)	2	1
An increase in course requirements	2	1
Greater flexibility for adult learners	2	1
Increased attention to international matters	2	1
New attention to values or ethics	2	1

B. Several national reports have recently called for change in undergraduate education. Has the reaction to these reports at your institution included any of the following:

	Yes	Planned	No
Discussion of the reports			
a. in faculty meetings	3	2	1
b. with the board of trustees	3	2	1
c. with outside consultants	3	2	1
Task force or committee to review the report(s)	3	2	1
Changes in academic programs	3	2	1
Changes in student services	3	2	1
Changes in research & assessment of students	3	2	1

III. RATINGS OF INSTITUTIONAL STATUS

Please rate your institution's current status on each of the following:

	Excellent	Very Good	Good	Fair	Poor
General level of preparation of entering students	5	4	3	2	1
Job prospects for degree recipients	5	4	3	2	1
Ability to respond to enrollment shifts	5	4	3	2	1
Ability to attract and hold good faculty	5	4	3	2	1
Adequacy of faculty development opportunities	5	4	3	2	1
Adequacy of faculty compensation	5	4	3	2	1
Overall financial condition of the institution	5	4	3	2	1
Adequacy of student financial aid, including scholarships, fellowships, and loans	5	4	3	2	1
Relationships with regional accrediting agencies	5	4	3	2	1
Relationships with specialized accrediting agencies	5	4	3	2	1
Relationships with federal agencies	5	4	3	2	1
Relationships with state agencies:					
On curriculum matters	5	4	3	2	1
On financial/budgetary matters	5	4	3	2	1
In general	5	4	3	2	1

IV. FACULTY

A. Were any full-time faculty hired in academic year 1985–1986 in:

	Yes	No
1. Tenure-track positions	2	1
2. Term or contract positions	2	1

B. Compared to a year earlier, did your institution have any *net* change in the number of:

	Net Gain	No Net Change	Net Loss
1. Full-time faculty	3	2	1
2. Part-time faculty	3	2	1

V. INTERNATIONAL EDUCATION

A. Does your institution have formal arrangements for the following overseas activities?

Circle as applicable:

	None	Latin Amer.	West Eur.	East Eur.	Africa/ Mid. East	Asia
Undergraduate study abroad	6	5	4	3	2	1
Graduate study abroad	6	5	4	3	2	1
Noncredit study abroad	6	5	4	3	2	1
Institution-to-institution linkages	6	5	4	3	2	1
Work internships for students	6	5	4	3	2	1
Overseas experience for:						
Language faculty	6	5	4	3	2	1
Other faculty	6	5	4	3	2	1
Technical assistance projects	6	5	4	3	2	1

	Don't Know	Under 10%	Under 25%	Under 50%	50% or more
B. About what percentage of your undergraduate students get experience with study abroad?	5	4	3	2	1
C. About what percentage of your enrollment is comprised of foreign students:					
Undergraduate	5	4	3	2	1
Graduate	5	4	3	2	1

	Required for all students	Required for some students	Not Required
D. Do you have a foreign language requirement for:			
Undergraduate admission	3	2	1
Completion of an undergraduate degree	3	2	1
Completion of a graduate degree	3	2	1

E. Does your institution offer language instruction or area studies in:

	Language Instruction		Area Studies	
	Yes	No	Yes	No
Arabic	2	1	2	1
Chinese	2	1	2	1
Japanese	2	1	2	1
Russian	2	1	2	1
Other nonWestern areas	2	1	2	1

VI. STUDENT ASSESSMENT AND INSTITUTIONAL EFFECTIVENESS

A. New methods of assessing student learning (e.g., other than traditional end-of-course grading) are being discussed currently. Which of the following do you believe to be *appropriate* for your institution? Which are now *used* at your institution to assess students?

	Appropriate		In Use	
	Yes	No	Yes	No
1. Placement tests for entering students in:				
Mathematics	2	1	2	1
English	2	1	2	1
Reading	2	1	2	1
Other skills	2	1	2	1
2. Both pre- and post-tests for remedial courses	2	1	2	1
3. Basic college-level skills tests (e.g., minimum competency or "rising junior" tests)	2	1	2	1
4. Knowledge testing on general education subjects (e.g., in history, humanities, science)	2	1	2	1
5. Comprehensive exams in a major	2	1	2	1
6. Attainment of higher-order skills in:				
Critical thinking	2	1	2	1
Quantitative problem-solving	2	1	2	1
Oral communication	2	1	2	1
Writing	2	1	2	1
7. "Value-added" measures of student gains while in college	2	1	2	1

B. For your campus, which of the following would be obstacles to the use of student assessment:

	Major Obstacle	Minor Obstacle	Not an Obstacle
There are no good evaluation instruments.	3	2	1
Assessment is not suited to our curriculum.	3	2	1
Most faculty do not support the concept.	3	2	1
There is no clear sense of what to evaluate.	3	2	1
No funds are available to develop assessment procedures.	3	2	1
Students would be unhappy with new forms of assessment.	3	2	1
We have fears about misuse of assessment results.	3	2	1
Key administrators lack sufficient interest.	3	2	1
Nobody here has the expertise to develop assessment procedures.	3	2	1

C. Certain states and accrediting agencies have called for the use of measures that indicate a college's effectiveness in accomplishing its mission. Which of the following do you believe to be *appropriate* for your institution? Which are now *used* by your institution?

	Appropriate		In Use	
	Yes	No	Yes	No
1. Number of students served	2	1	2	1
2. Number of courses completed or credits earned	2	1	2	1
3. Retention and graduation rates	2	1	2	1
4. Number of degrees/certificates awarded	2	1	2	1
5. Pass rates on professional licensing examinations	2	1	2	1
6. Standardized test scores of:				
Graduates in professional programs	2	1	2	1
Other graduates	2	1	2	1
7. Other measures of student learning	2	1	2	1
8. Percent of students going on for further education	2	1	2	1
9. Honors and other achievements of recent graduates	2	1	2	1
10. Job placement rates of graduates (by field)	2	1	2	1
11. Quality of graduates' performance on the job	2	1	2	1
12. Ratings of the institution by graduates	2	1	2	1
13. Long-term outcomes of graduates (e.g., 5, 10, or 15 years later)	2	1	2	1
14. Achievements of faculty	2	1	2	1
15. Institutional accomplishments in:				
Obtaining grants and contracts	2	1	2	1
Community services	2	1	2	1
Research	2	1	2	1

D. Please indicate your own views on each of the following statements:

	Agree	Disagree	Uncertain
This institution's leadership (president and other key officers) favors the development of student assessment procedures.	3	2	1
Most faculty at this institution would support the development of student assessment procedures.	3	2	1
Development of student assessment at this institution will require much experimentation.	3	2	1
There has been very little systematic discussion of student assessment at this institution.	3	2	1
Use of nationally standardized tests for purposes of student assessment risks distorting the educational process.	3	2	1
Student assessment should focus on broadly defined outcomes and competencies, not on easily learned skills and knowledge.	3	2	1
Student assessment should be closely tied to efforts to improve instruction.	3	2	1
Student assessment should include substantial feedback to students.	3	2	1
Results of student assessment should be linked to analyses of institutional effectiveness.	3	2	1
Results of student assessment should be linked to institutional planning and budgeting.	3	2	1
All colleges and universities should develop and publish evidence of their institutional effectiveness.	3	2	1
As a condition of accreditation, colleges should be required to show evidence of institutional effectiveness.	3	2	1
States should require colleges to show evidence of institutional effectiveness.	3	2	1
Most campus officials have strong fears about misuse of effectiveness measures by external agencies.	3	2	1

Thank you for your cooperation.

Please return this form by **April 21, 1986,** to:

Higher Education Panel
American Council on Education
One Dupont Circle, N.W.
Washington D.C. 20036

Please keep a copy of this survey for your records.

Name of Respondent ____________________

Title ____________________

Department ____________________

Telephone ( ) ____________________

If you have any questions concerning this survey, please call the HEP staff collect at (202) 939-9445.

APPENDIX B: TECHNICAL NOTES

The Higher Education Panel forms the basis of an ongoing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct specialized surveys on topics of current policy interest to the higher education community.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities, divided into two half-samples of 520 institutions each. The sample was drawn from the more than 3,200 colleges and universities listed in the *Education Directory, Colleges and Universities* issued by the U.S. Department of Education. The Panel's stratification design is based primarily upon institution type, control, and size. For any given survey, either the entire Panel, a half-sample or an appropriate subgroup is used.

The survey operates through a network of campus representatives who, through their presidents, have agreed to particpate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus official for response.

The sample for this study consisted of 456 institutions in one of the half-samples but excluded specialized religious institutions (such as rabbinical seminaries) and those institutions that offer no undergraduate instruction. The questionnaire (see Appendix A) was mailed on March 17, 1986, with the request that it be completed by the academic vice-president. After mail and telephone followups, 365 responses were received or 80 percent of those surveyed. Actual respondents included: provosts, deans, or academic vice presidents, 48 percent; associate deans or provosts, 10 percent; presidents, 13 percent; and other, 29 percent.

Data from responding institutions were statistically adjusted to represent 2,618 colleges and universities. The stratification design is shown in Table B-1.

The weighting technique, used with all Panel surveys, adjusts the data for item and institutional nonresponse within each cell. Institutional weights are applied to bring the Panel data up to estimates that are representative of the national population.

Tabel B-2 compares survey respondents and nonrespondents on several variables. Response rates were generally even across institutions. Higher-than-average response rates were recorded for public universities and for private baccalaureate institutions. Response rates for private two-year colleges were lower than average.

TABLE B-1:—Stratification Design

Cell	Type of Institution	Enrollment	Population	Respondents
	Total		2,618	365
1	Large public doctorate-granting	a	104	47
2	Large private doctorate-granting	a	58	21
3	Large public comprehensive	a	92	35
4	Large private comprehensive	a	26	9
7	Large public two-year	a	43	15
8	Public comprehensive	5,500–8,999	56	14
9	Public comprehensive	<5,500	108	20
10	Private comprehensive	<9,000	126	19
11	Public baccalaureate	<9,000	127	17
12	Private baccalaureate	1,350–8,999	166	22
13	Private baccalaureate	<1,350	446	32
17	Public 2-year academic/comprehensive	6,000–8,999	55	14
18	Public 2-year academic/comprehensive	4,000–5,999	72	15
19	Public 2-year academic/comprehensive	2,000–3,999	155	21
20	Public 2-year academic/comprehensive	<2,000	332	19
21	Private 2-year academic/comprehensive	<9,000	129	10
22	Public two-year occupational	2,500–8,999	63	11
23	Public two-year occupational	<2,500	221	18
24	Private two-year occupational	<9,000	239	6

[a] Institutions that meet one or more of the three following criteria: (a) total full-time equivalent (FTE) 1981 enrollment greater than 8,999; (b) FTE 1981 graduate enrollment greater than 749; (c) FY 1979 educational and general expenditures of $35 million or more.

TABLE B-2:—Comparison of Respondents and Nonrespondents
(In percentages)

Control and Type of Institution	Respondents (N = 365)	Nonrespondents (N = 91)	Response Rate
Total	100.0	100.0	80.0
Control			
Public	67.4	62.6	81.2
Private	32.6	37.4	77.8
Type and Control			
Public University	31.8	24.2	84.1
Private University	13.5	17.6	75.4
Public Baccalaureate	4.7	5.5	77.3
Private Baccalaureate	14.8	11.0	84.4
Public Two-Year	31.0	33.0	79.0
Private Two-Year	4.4	8.8	66.7

Other Reports of the Higher Education Panel
American Council on Education

Gomberg, Irene L. and Atelsek, Frank J. **Nontenure-Track Science Personnel: Opportunities for Independent Research.** Higher Education Panel Report, No. 39, September, 1978.

Atelsek, Frank J. and Gomberg, Irene L. **Scientific and Technical Cooperation with Developing Countries, 1977-78.** Higher Education Panel Report, No. 40, August, 1978.

Atelsek, Frank J. and Gomberg, Irene L. **Special Programs for Female and Minority Graduate Students.** Higher Education Panel Report, No. 41, November, 1978.

Gomberg, Irene L. and Atelsek, Frank J. **The Institutional Share of Undergraduate Financial Assistance, 1976-77.** Higher Education Panel Report, No. 42, May, 1979

Atelsek, Frank J. and Gomberg, Irene L. **Young Doctoral Faculty in Science and Engineering: Trends in Composition and Research Activity.** Higher Education Panel Report, No. 43, February, 1979.

Atelsek, Frank J. and Gomberg, Irene L. **Shared Use of Scientific Equipment at Colleges and Universities, Fall 1978.** Higher Education Panel Report, No. 44, November, 1979.

Gomberg, Irene L. and Atelsek, Frank J. **Newly Qualified Elementary and Secondary School Teachers, 1977-78 and 1978-79.** Higher Education Panel Report, No. 45, February, 1980.

Atelsek, Frank J. and Gomberg, Irene L. **Refund Policies and Practices of Colleges and Universities.** Higher Education Panel Report, No. 46, February, 1980.

Gomberg, Irene L. and Atelsek, Frank J. **Expenditures for Scientific Research Equipment at Ph.D.-Granting Institutions, FY 1978.** Higher Education Panel Report, No. 47, March, 1980.

Atelsek, Frank J. and Gomberg, Irene L. **Tenure Practices at Four-Year Colleges and Universities.** Higher Education Panel Report, No. 48, July, 1980.

Gomberg, Irene L. and Atelsek, Frank J. **Trends in Financial Indicators of Colleges and Universities.** Higher Education Panel Report, No. 49, April, 1981.

Atelsek, Frank J. and Gomberg, Irene L. **An Analysis of Travel by Academic Scientists and Engineers to International Scientific Meetings in 1979-80.** Higher Education Panel Report, No. 50, February, 1981.

Atelsek, Frank J. and Gomberg, Irene L. **Selected Characteristics of Full-Time Humanities Faculty, Fall 1979.** Higher Education Panel Report, No. 51, August, 1981.

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